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Year-end Double Issue

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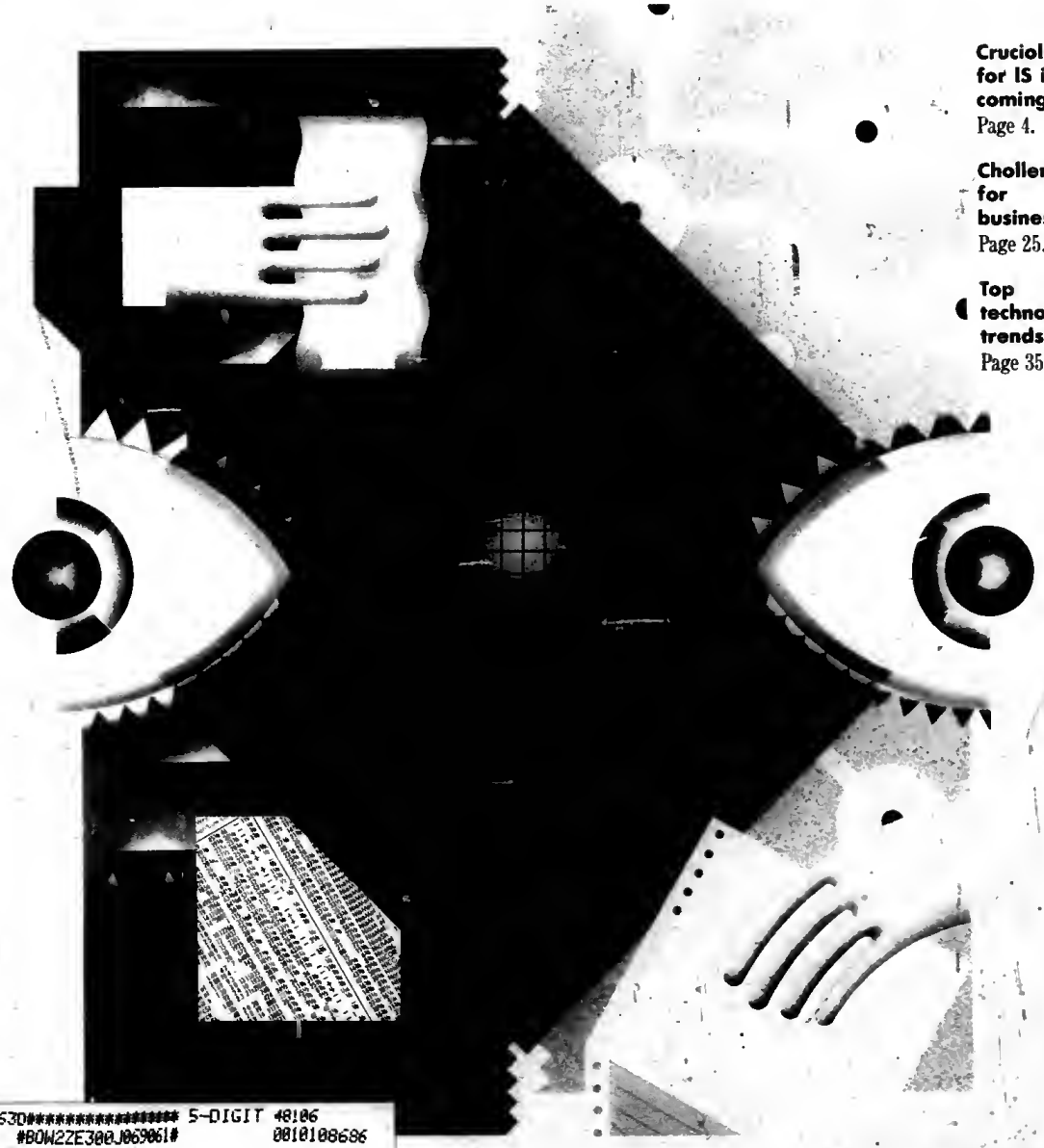

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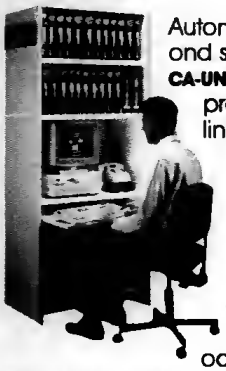

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IN THIS ISSUE

COVER ILLUSTRATION BY JOSE CRUZ

OVERVIEW

Forecast 1990

A gray year dawns as the clock ticks on

BY JOSEPH MAGLITTA

As the new year begins, information systems managers and the larger computing world will face a landscape not unlike the one left behind on the last day of 1989: gray, uncertain, not wholly bad but definitely not bright. On New Year's Day 1990, IS will awaken to a world that is shrinking and growing, more technological, yet more human, with stakes that are higher than ever.

The biggest shrinkage will be economic; while forecasters no longer predict a recession, most agree that the U.S. economy will slow in 1990. Real economic growth in the U.S. is expected to drop from 3% in 1989 to between 2% and 3% in 1990. The most optimistic scenarios are for a sluggish start, followed by a pick-up in late 1990 or 1991.

The computer industry itself is also slimming. Reductions of 10,000 at IBM, 8,000 at Unisys, 4,200 at Wang, 2,500 at Prime, 3,100 at Control Data, 1,600 at Bull, 2,200 at Data General and other cuts means that the computer industry will begin the decade with the bleakest employment picture since the early 1980s. Mergers and acquisitions continue to shrink the number of large software firms. Investors continue to shy away from high-tech stocks, even though technology attracted $2.8 billion in new venture capital last year. Hambrecht & Quist's high-tech index of 175 firms continued a two-year drop, totaling 19.5%. Many are watching nervously to see if and when corporate downsizing will continue.

This stale economy worsens what promises to be the biggest pressure on U.S. business this year, what federal budget director Richard Darman terms "now-nowism" — heavy corporate pressure to make short-term profits. Unfortunately, the unpleasant end result for many IS departments will be smaller staffs and leaner budgets.

While corporate downsizing continues, so too does the trend to downsize IS. By shifting applications to networked PCs, workstations and client/server systems, many businesses hope to build cheaper, more flexible systems. Information technology is also getting smaller and cheaper. Prices continue to fall on everything from mainframes to PCs to chips, thanks to heavy competition, technological advances and economies of scale. PCs have all but conquered the desktop, and handheld computers and portables are among the hottest new items at year's end.

Paradoxically, as industries and computer products shrink, other parts of the IS world are growing. Ongoing European unification, Japanese expansion and dramatic Eastern Bloc upheavals guarantee that interest in globalization will stay at a fever pitch in 1990. In a recent survey by *Fortune* magazine and Ernst and Young, 50% of Fortune 500 industrial organizations said they were seeking merger and acquisition targets in Europe.

There are clear signs that high interest in people will continue to blossom in 1990 and beyond. "Demographic and sociopolitical forces are making the 1990s the decade of the employee," says John Diebold, founder and chairman of the Diebold Group. Faced with a smaller, less educated work force, more firms will discover that the key to future success hinges on finding and keeping good "human capital."

The new focus on people doesn't mean that technology will take a backseat in 1990, however. While 1989 was not a banner year for new products, technological advances continue to open new doors for IS. "Strategic systems can be built that were not possible three years ago," says consultant Larry DeBoever, ticking off LANs, WANs, SQL, client/server systems, 4GLs and CASE as examples. Analysts say firms will need a keen grasp of all available tools just to stay in the ball game.

JOSE CRUZ

Of course, for every firm playing with dazzling, cutting-edge technologies, hundreds of others will plod into 1990 with far less glamorous agendas. The more honest ones will admit to struggling just to keep apace of key day-to-day or mission-critical applications, to say nothing of longer range strategic pursuits. Many tasks, says Bose IS executive Warren Harkness, "are not strategic but survival."

The preoccupation with "solutions" doubtlessly will continue in 1990. "Management at all levels is looking for answers, not technology," says IBM's George Conrades. Such platitudes telegraph an important reality: Technology alone will no longer suffice.

It's little wonder that against this complex backdrop of organizational and technological change IS continues its intense self-analysis. Pressures to accomplish more, faster and better have ushered in what CCA President Mel Bergstein calls "a time of experimentation." Many firms are looking at how IS is organized and how things are done. At the same time, the role of the IS manager will continue to be examined and reexamined.

The biggest challenge facing IS in 1990, however, will be a familiar one: using IS for business survival and growth. A harsher competitive landscape promises to exert even greater pressure on IS to pull its own weight and to move from cost center to profit center. This less kind, less gentle reality has heightened interest in networking, integration, open systems, outsourcing, software leasing, cooperative processing, groupware, graphical user interfaces and a host of other approaches designed to squeeze the most from technology investments.

At year's end, a distinct undertone of concern and, perhaps, alarm underlies many statements by industry watchers. Dataquest Vice-President Steve Lair sees the next two years "as a period of survival." Diebold concurs: "Wise use of technology will be a major management challenge. Not only will success depend on it, but the very survival of the organization will, too." In the background is the Greek chorus of the MIT Commission on Industrial Productivity, which warns that the U.S. computer industry faces "further deterioration unless substantial actions are taken."

The New Year's message is clear: U.S. businesses have the tools, but the time to use them or lose them is running out. MIT's Lester Thurow sums up the challenge this way: "Catch up, get back in — that is the name of the game. In the 19th century, we were the world's best at the game. Today, we are out of practice. Tomorrow?" •

EDITORS' NOTE

Forecasting, as IBM's John Akers noted earlier this year, is a complex art. So when we began planning for this special double issue of *Computerworld,* we decided to focus on one simple question: "What key trends and events are likely to affect IS professionals this year?" Nearly three months of planning, hundreds of phone calls and thousands of hours researching, writing and editing produced the issue you hold in your hands. We hope you will find "Forecast 1990" an informative and entertaining guide to the coming year.

Joseph Maglitta
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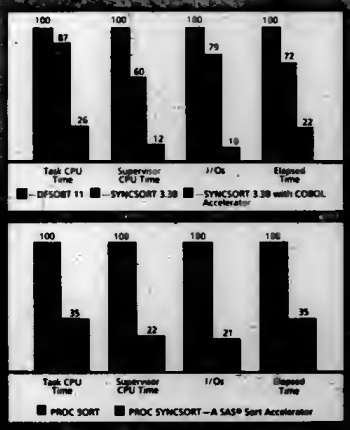
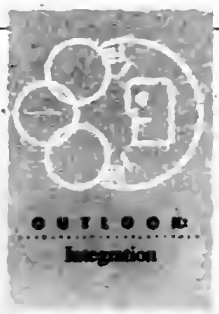
SYNCSORT PRESENTS 3 NEW WAYS TO MAKE SHORT WORK OF LONG JOBS.





The race goes on

BY HELEN PIKE

The Big Race to Integrate will run like a road rally through the early years of the 1990s. The big question: Who will drive and who will be driven?

In rallies past, computer hardware vendors have pretty much taken the wheel, determining technical trends, price and availability and otherwise setting the pace of what and when IS departments buy.

But in this century's final lap, more IS executives will be in the driver's seat as their companies look for ways to cope with increasing economic pressures to run faster, cheaper and better.

Savvy information systems managers are mandating that vendors supply the software and communications products that can network, interconnect, distribute, interoperate and manage the islands of automation that have arisen during the 1970s and '80s.

Some are bypassing vendors altogether and doing the job themselves.

Don't rule out the possibility of backseat driving by computer makers, though. Traditional hardware vendors will use the "integration" label to rev up slowing sales while trying to be all things to all customers.

In fact, says Marty Gruhn, an IS consultant based in Mesa, Ariz., "integration is going to be this marvelous buzzword for the first half of the 1990s, and computer vendors are going to be running after it. But there's not going

Continued on page 6

The IS identity crisis

Technical guru. Business whiz. Can one person do it all?

BY MICHAEL L. SULLIVAN-TRAINOR

Like itinerant preachers in the Old West, the leading lights of information systems have been traveling across the countryside proclaiming a new gospel. Their message for the 1990s is a simple one: IS professionals shall go forth and learn about their company's business. Further, they shall develop human relations, change-management and leadership skills to rival the best organizational consultants.

While the soothsayers have found many converts, including those with backgrounds on the business side, there is dissatisfaction among technical professionals reluctant to subscribe to the new faith.

"The technical side is no longer a prestige place to work," says Eugene Clarke, who left a technical position at Eaton Pharmaceuticals in Norwich, N.Y., to pursue an MBA in IS. "As prestige goes further and further to the business side, the technical people feel left out. That's why you see so much job hopping."

Continued on page 6

PETER KUPER

Handling life during crunch time

BY LAURA O'CONNELL and JOSEPH MAGLITTA

Rare is the information systems organization these days that hasn't been asked to tighten its belt or do more with less. Whether it's shrunken capital or operating budgets, precious few organizations can expect to continue spending in 1990 as they did in the fatter years of the past decade. How are IS managers coping with these leaner, more demanding times of hiring freezes and higher management expectations? In several ways — many of which do not depend on technology.

Some IS chiefs are focusing on people issues — keeping employees challenged and happy — and measures calculated to boost employee efficiency and satisfaction.

Others are concentrating on technology, streamlining and automating operations to achieve greater efficiency that can offset staffing and equipment cuts.

The following are brief profiles of four organizations making the most of their IS resources:

At Midwest Energy Co. in Sioux City, Iowa, the focus is clearly on people. Richard Kane, manager of information systems, says finding and keeping good employees has been a top priority since he joined the company six years ago — and it's an even bigger one now.

"One of the biggest downfalls in many IS shops is the high turnover rate, so they're constantly training people," Kane explains. Because training new technicial staff members can take thousands of dollars and two years or more, minimizing turnover is a big money saver, he says.

Besides offering salaries competitive for the Sioux City area, Kane's secret for keeping employees involves hiring only those who are sure they want to settle in Iowa: "With most of our employees, when we hire them, we make sure that they aren't interested in going to Los Angeles or San Francisco or the San Jose area, that they want to live in the Midwest and they like the environment here."

As you'd imagine, finding qualified technical staff can be tough, Kane says. Once they are on board, Midwest Energy will go to great lengths to develop its employees. An example: Last year the company initiated an expensive program called "Transformation" to foster team and individual development. The program, a kind of "Outward Bound" for all employees, was administered by an outside firm and cost Midwest millions, according to Kane. (The funds came from corporate coffers, he adds, not from IS.)

Participants in the two-day outing — described by Kane as "a self-evaluation and self-development process" — climb ropes and engage in other outdoor challenges designed to test individual limits and build team unity.

While unconventional, Kane says, the program works. Nearly half of his

Continued on page 13

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1 IBM Journal of SAA 2 DATAPRO survey, August 1988, companies with sales over $10 million 3 Donaldson, Lufkin & Jenrette report

IS crisis

FROM PAGE 4

Many technical professionals balk at the change in identity implied by the new emphasis on "soft skills." They are reluctant to turn in their technical titles and become account representatives.

"Marketing IS services is a role that is not comfortable for a lot of people," says Ralph Loftin, a Newton, Mass.-based consultant at Dooley Group. "These people feel their technical skills are not being recognized and rewarded to the extent that interpersonal and political skills are rewarded."

As companies try to prepare IS for the '90s, their actions are increasing the dissatisfaction among technicians. For example, some companies, such as McKesson Corp. and Ralston Purina, have promoted non-IS business executives to the top IS position, sending a signal to technicians that their skills will not get them to the highest rung in the career ladder.

"In the long run, the people who are going to move from IS to top management are more likely to be the people who came into IS as business generalists," says Irwin F. Bernstein, who moved over to IS from the business side 30 years ago. Currently, Bernstein is vice-president of planning and administration at Maidenform, Inc. in Bayonne, N.J.

In addition, some IS organizations have a habit of making sweeping changes without preparing their employees for the new order. "Quite often, the IS management group gets an idea, like increasing the staff's business orientation, and they say, 'That's a good idea; let's do it,' " Loftin says. "The IS organization can be restructured literally over the weekend."

Such moves catch both IS professionals and the user community off-guard. "When the IS professional shows up one day with his business card saying he's an account rep, the user may never have heard he was supposed to have an account rep. That kind of situation sets the IS professional up to fail from the outset," Loftin adds.

Taking these objections into account, early experimenters with new IS organizational structures are recognizing that the job description of the ideal IS professional is an impossible order to fill.

> "IN THE long run, the people who are going to move from IS to top management are more likely to be the people who came into IS as business generalists."
>
> IRWIN F. BERNSTEIN
> MAIDENFORM

"You need this universal genius who can understand strategy and business as well as the technology and be highly proficient with the issues of change and people," says Charles Palmgrin, a senior consultant at O. D. Resources, Inc., an Atlanta-based management consulting firm specializing in organizational change.

"You're asking for a new breed of people," Palmgrin adds, "but what you have available are people who are strong on technology and business or on business and people. The most rare are professionals who are strong on technology and people. If there are any professionals who are good at all three, there aren't enough of them to go around."

The scarcity of professionals possessing a highly integrated set of skills is matched by a similar lack of technical professionals capable of handling the increasing complexities of modern systems. "In our technology plan, we are talking about building systems that run across multiple platforms and require very sophisticated user interfaces," says Vita Cassese, director of pharmaceutical systems at Pfizer, Inc. in New York.

Because of these requirements, the IS organization of the future will be staffed by teams of professionals whose skills represent a continuum of capabilities, ranging from highly technical to highly people- or business-oriented. Managers will use a composite approach, mixing people with varied backgrounds to achieve the attributes of the ideal IS professional.

The key challenge facing IS managers in the 1990s will be keeping all the members of these teams rewarded and engaged in the mission of the organization.

"How do we keep groups together where we have high individual creativity on one hand and yet very cohesive teamwork on the other hand?" asks Michael Thorsen, director of MIS for Datacard Corp. in Minneapolis, the largest supplier of equipment used in the credit card industry.

One answer is to solve the problem organizationally by locating the highly technical professionals in centralized groups and sending the more human relations-oriented staff members into the user organizations to act as liaisons.

"This division lets the technical people in IS concentrate on what they're good at — running machines, doing backups and security procedures," Clarke says. "There's no longer two camps within one function. It's basically two separate functions."

While some companies have tried this approach, many managers are concerned about the problems it creates. One issue is that the division of IS into corporate and divisional identities sets up the potential for conflict between corporate goals and divisional initiatives. While this contention exists anyway in companies with semi-autonomous divisions, splitting the IS organization can make technology planning the new battleground for conflict.

Advocates of the divide-and-conquer approach have an answer for this concern: "That's really why you have an IS steering committee," Clarke says. "Their role is to set standards and select projects to be considered from the user areas."

A second issue, which is more difficult to counter, is the tendency of technical professionals, operating in an isolated corporate function, to lose sight of the business needs of the company.

"Putting the technical people into an organization of their own will cause them to become disassociated from why they're doing the work at all," says Jim Goughenour, vice-president of customer service and distribution at The Hon Co. in

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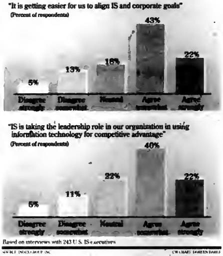
Getting in sync

IS chiefs are making strides in combining IS and business goals



Based on interviews with 243 U.S. IS executives

SOURCE: INDEX GROUP INC. CW CHART: DOREEN DAILS

The race

CONTINUED FROM PAGE 4

to be a lot of profit, and [integration] is going to be hard to manage."

F. Warren McFarlan, a professor at the Harvard Business School and specialist in business information systems, agrees that a savvier IS community will more closely scrutinize a vendor's solutions to integration problems.

What do the 1990s hold for integration? Look for these key trends:

• **Computer vendors-turned-systems integrators.** Growth-hungry computer companies will increasingly try to mold themselves as integration or "solution" providers to fuel flagging growth, according to some analysts. However, some predict this strategy will go awry. The reason: Small, flexible software firms will be better equipped to supply the innovations IS will seek to enable multivendor computing.

• **Increased emphasis on integrated databases and applications.** Organizations as diverse as Ohio-based steel manufacturer Timkin Co., Children's Hospital in Boston and Affiliated Bankshares of Colorado are integrating databases and applications. By focusing on the business aspect of data, such organizations are seeking greater cost savings and productivity. IS people should guide development of an integrated data model, but the source for such a project should be functional managers, says Jim Funk, a data administrator who helped build a data model at Wisconsin Gas Co. in Milwaukee and who is now doing the same at Johnson & Johnson.

• **A bigger role for communications.** This trend is especially notable in two areas: One is fiber-optics-based wide-area networking, which can accommodate the transmission of integrated voice and data and, eventually, video. The other is finding a cost and capacity alternative to leased lines.

For example, Morrison & Foerster, the U.S.' twelfth largest law firm, spent $20,000 a month on data transmission, $70,000 for voice communications and $3,000 on facsimile services for just one office in a year in which the employee growth rate was 25%.

To cut costs, the firm installed an integrated voice/data system that includes a 24-channel bandwidth line leased from a T1 carrier for $45,000 per month.

• **More business alliances.** Networking strategy is rapidly becoming the anchor of many organizations' business plans. The past year saw trendsetting agreements between Sears, Roebuck and Co. and IBM, as well as between Citibank Visa and American Airlines.

IBM and Sears formed Prodigy Services Co., a videotext venture that gives users access to on-line home shopping, banking, news and other services. American Airlines uses data from Citibank Visa credit card purchases to grant frequent-flier miles. Citibank Visa, in turn, uses American's Sabre reservations network to help increase its customer base.

Partnerships such as these will be facilitated by the extensive use of networks in every business, says Bill Davidson, a professor at the Graduate School of Business at University of Southern California.

• **A buyer's market for multivendor service contracts.** Expect competition among vendors for lucrative contracts to service mixed-vendor computer environments. IS users will be in position to set the terms of those contracts. One example is Sun Exploration & Production Co. of Dallas. The firm put together a 25-page contract with Control Data Corp. that included several beneficial clauses: a two-year price freeze, Sun's right to cancel the contract within 30 days, a stipulation that CDC use Sun E&P's computerized trouble-reporting system so that performance could be tracked and CDC's commitment to stay on the job until a problem is corrected.

Integrating business and technology is a fact at firms that began automating their operations a decade ago. Going into the 1990s, firms will be forced to run leaner operations.

For all these organizations, it is a matter of keeping a business on track — or not having a business to drive at all. ■

MINI POLL

How will you spend time and money?

The ongoing everyday stuff could be the big-ticket areas. We have 50 or 60 facilities, meaning we always have upgrades in the works. My own personal goals for 1990 will be in two areas: electronic data interchange and manufacturing.

Vincent Sawyer, *vice-president of corporate systems at Sara Lee Corp., Chicago.*

This year, we will implement our new Strategic Banking System, which was a joint effort by Electronic Data Systems Corp. and us and was three years in development. It will replace our existing deposit application system. We will also be implementing some new technology in other areas, such as an imaging system in our credit card area.

David Van Lear, *president and CEO at Banc One Services, Banc One Corp., Columbus, Ohio.*

I would say we'll concentrate on whether the organization is arranged effectively to get the maximum use of technology. We will look to truly exploit knowledge-based technology. And we'll explore the opportunities in image technology and how to move to a consistent office environment.

John D. Loewenberg, *senior vice-president at Aetna Life and Casualty Co., Hartford, Conn.*

One of the first things we will be doing in 1990 is to reassess our applications portfolio. Most of our applications were built over the past 20 years to fit functional areas. We would like to refocus them to ensure that they fulfill the needs of the business processes as opposed to just functions. We also have to make sure our applications support network concepts and structures.

We're going to take a hard look at imaging. Prices have come down significantly, and it could prove to be cost-effective for the company.

Gary Biddle, *vice-president of information and systems technology, American Standard, Inc., Piscataway, N.J.*

SALLY CUSACK

Continued from page 6

Muscatine, Iowa, part of Hon Industries, a large office furniture manufacturer.

The more difficult challenge, but one that provides the most promising solution, is to establish project teams to carry out IS objectives. The teams are based in a single organization that works closely with users and technology.

For example, at Pfizer, Cassese's systems group relies on review committees composed of "supertechnicians," who are the most technically savvy staff members, as well as other professionals who possess MBAs, generalist views of technology and strong consulting skills.

"The supertechnicians critique the projects to ensure that they are going in the right direction," Cassese says.

Cassese's staff of 60 is made up of 40% technologists and 60% consultants. "It's sometimes hard to tell who is what because each person has a different mix of skills," she adds.

At Maidenform, Bernstein also emphasizes teamwork, while de-emphasizing prescribed roles for systems professionals. "We try to figure out what assets each person has instead of having very specific job descriptions," he says.

With a tradition of hiring IS professionals who understand the user areas but are less sophisticated technically, Bernstein is now finding he needs professionals with more advanced technical skills.

"We are recognizing that we have projects that require enterprise analysis. We need someone to describe and classify the data across the company and develop a structure for it," he says.

Despite the increase in technical demands, managers must get the staff to identify with the business and not with the technology if they want sucess at keeping their team members working toward the same goal.

"You have to look at the value system of the team members — what is it that the technologists really want to achieve?" Palmgrin asks. "You have to engage them in seeing that the systems they create are successfully implemented and utilized, not just developed and tossed over to the users to see what will happen." ●

Sullivan-Trainor is *Computerworld's* senior editor, special projects.

Outsourcing: Fad or fantastic?

Budget pressures will keep it alive, but companies need to tread carefully

BY CLINTON WILDER

Outsourcing is a little like cholesterol.

First, it was considered bad, an admission of failure by information systems departments. Then the IS community discovered "good" outsourcing and "bad" outsourcing. Now, as the new decade dawns, there is a great deal of confusion about the issue, with many longing for the days when you could simply eat your porterhouse steak and run your own data center without feeling guilty.

Few doubt that 1989's wave of interest in farming out data center operations to service vendors will continue to build in 1990. Unprecedented pressure on IS departments to cut costs and divert IS resources from mundane support functions to more strategic areas will spur more companies to weigh outsourcing's benefits.

Unfortunately, though, outsourcing has achieved buzzword status, leading to confusion, misunderstanding and fear. Vendors such as IBM, Electronic Data Systems Corp. (EDS) and Andersen Consulting are rapidly blurring traditional boundaries in the marketplace, offering a supermarket of services including outsourcing, systems integration, programming services and facilities management. Meanwhile, users such as Eastman Kodak Co. and Merrill Lynch & Co. are approaching outsourcing in such different ways that it is hard to include them in the same category.

"I used to have a standard editorial that I would dust off for every new buzzword," says John Kirkley, a former computer magazine editor who is now an independent consultant in Warwick, N.Y. "It would say, 'It's wonderful for the vendors selling it and the editors writing about it, but nobody knows what the hell's going on.' " Kirkley places outsourcing in this category.

Much of the confusion arises because outsourcing is a modern variation on an old theme — the time-sharing days of mainframe service bureaus, whose huge mainframes would perform number-crunching for corporate clients. Outsourcing today, as practiced successfully by American Standard, Inc., Foodmaker, Inc., H. J. Heinz Co. and many others, means simply running your applications remotely on the service vendor's hardware.

However, that type of outsourcing is often confused with the following:

- **Facilities management.** A process in which you hire the vendor to run your existing data center. This can often mean the whole-ball-of-wax approach preferred by EDS, which includes applications development and maintenance as well as operations — in effect, the replacement of in-house IS. Within the past two years, firms such as Southland Corp. in Dallas and Meritor Financial Corp. in Philadelphia, both under severe cost-cutting pressure, have chosen this route.
- **Contract programming for specific projects.** The bread-and-butter business of Buffalo, N.Y.-based Computer Task Group, Inc. (CTG) and parts of Andersen Consulting do not involve farming out an existing function at all. Instead, such firms bring additional outside resources for specific needs. Some vendors are becoming fond of calling this choice "systems integration."
- **Contracting out network management.** With large influential users such as Merrill Lynch and Warner Communications, Inc. leading the way, 1990 should see a wave of deals with the Big Three long-distance carriers. It is likely that the projected shortage of technical skills in the 1990s, particularly in global telecommunications, will drive this trend.

"But you can be sure that Merrill Lynch will keep some very capable people to manage the contractor [MCI Communications Corp.]," says Dudley Cooke, a retired Sun Co. IS chief now running Executive Insight Group in Bryn Mawr, Pa.

- **Software maintenance outsourcing.** A relatively new ground is expected to attract increasing interest in 1990 — if IS executives can overcome the fear factor, says Alan G. Hammersmith, a principal at New York-based management consultancy A. T. Kearney, Inc.

"It's the area they're most reluctant to give up, because they feel they know their own systems best," Hammersmith says. "But one of the biggest problems facing IS today is having the same people working on both new applications development and maintenance. That just kills any chance to be successful in either area."

Even among data center outsourcing's most enthusiastic proponents, software development has been the Maginot Line. Applications are considered the strategic assets in which IS managers want to focus their attention. "You cannot give away the applications," Kirkley says.

But even that is changing. Companies are beginning to consider which pieces of their software operation are truly strategic and which are not. Kodak, for example, is negotiating with CTG and Andersen about outsourcing some development projects. In 1990, other firms will attempt to analyze the development function.

"If it's the systems analysts who interface with the users, perhaps you could outsource the programming itself," says Ed Henry, the veteran director of IS at Mosler, Inc. in Hamilton, Ohio.

Mosler has outsourced its data center operations to Genix Corp. in Pittsburgh but has also looked at its development expenditures and replaced homegrown payroll and fixed assets applications with vendor packages. "If you go to enough packages, you can reduce programmers," Henry says.

Outsourcing within IS is (and will continue to be) part of the larger trend in corporate America to carefully examine functions for possible cost savings. In a 1989 *Wall Street Journal* column entitled "Sell the Mailroom," management guru Peter Drucker predicted that companies will evaluate all support functions with the question, "Could we do this cheaper — and better — by going outside?"

There is a very strong consensus that outsourcing of operations will continue to grow by 17% annually through 1994, predicts Input, Inc., a Mountain View, Calif.-based research firm. But in 1990 and beyond, the key question facing IS departments is not only *whether* to outsource, but *what* to outsource.

"Many are looking at it, but the approach will vary widely from organization to organization," Kirkley says. "There are security, privacy and control issues. It takes a very courageous individual to pull off something like this and not be really fearful of losing his own power."

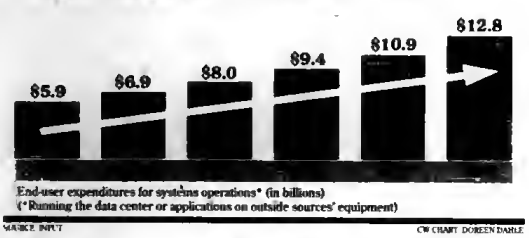
Tentative or not, outsourcing, like cholesterol, will become an increasingly prominent fact of life for IS departments to deal with in 1990 and beyond. Whether or not a company decides to hop on the bandwagon, many senior executives are becoming curious about the option, partially from the publicity generated in 1989 by Kodak.

Douglas Wilder, director of systems integration research at Input's Vienna, Va., office, says, "We see a lot more direction from top management saying, 'Let's look at it. Let's see if it makes sense for us.' " ●

HAL MAYFORTH

Outsourcing spending

Money spent on farming out data center operations is expected to increase



End-user expenditures for systems operations* (in billions)
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Wilder is *Computerworld*'s senior editor, management.

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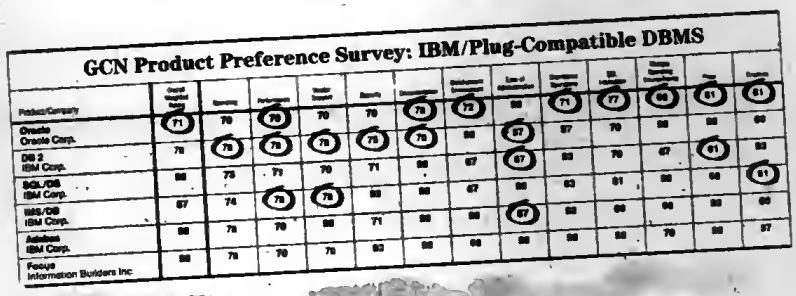

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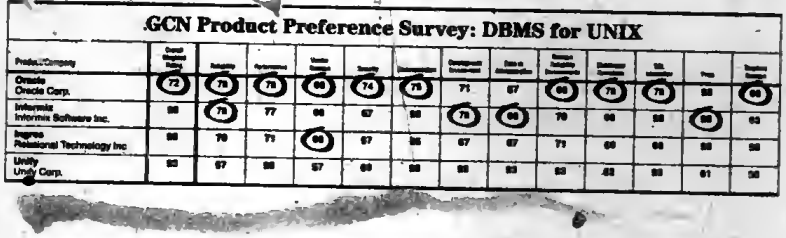

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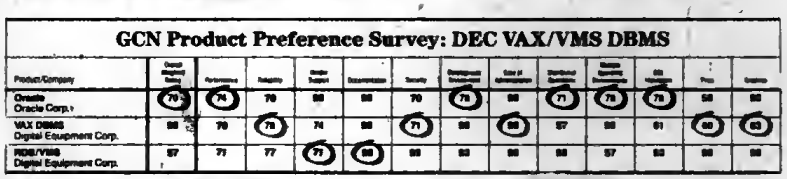

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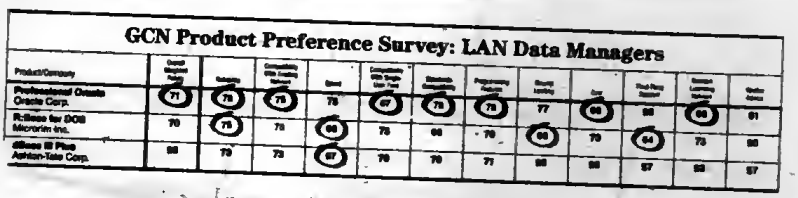

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COMP WORLD

Drowning in a sea of code

As a new year dawns, organizations struggle to keep from being swamped by their backlogs

BY MARYFRAN JOHNSON

As massive and daunting as the ocean itself, the backlog of applications development work in corporate computer centers has a bottomless quality. Yet while paper-intensive industries such as banks and insurance companies are still swimming against the tide of neglected applications projects, a few companies are spotting dry land on the horizon in 1990.

The growing use of programming and software engineering tools, plus better-trained end users, is helping some organizations to rise above the backlog. Others are experimenting with expert systems, object-oriented technology, imaging systems and electronic data interchange (EDI) in hopes of reducing the need for extensive applications development.

A brace of application development tools, including several from IBM, are scheduled to ship in the coming year. Judging from consultants and users, they'll arrive none too soon. "Backlogs are so big that most people have stopped counting them in any meaningful fashion," says Tom O'Flaherty, vice-president of Input, a market research and consulting firm in Parsippany, N.J.

Analysts say that maintaining existing code and enhancing current systems can take up 60% to 75% of the IS department's work time. "There's an awful lot of [Cobol] code out there — probably 50 billion lines — and it's been patched, repatched and enhanced for 25 years," says Les Hellenack, an analyst of new software technologies at International Data Corp. in Framingham, Mass.

> "BACKLOGS ARE so big that most people have stopped counting them in any meaningful fashion."
>
> TOM O'FLAHERTY
> INPUT

Unfortunately, big backlogs often present a no-win situation, O'Flaherty says. IS faces a dilemma similar to a man giving away money on a street corner.

"No matter how much money he's brought along, he is going to run out. IS is in the same boat because it must supply information and program processing — finite resources with no limits on the demands placed on them," he adds.

In hopes of improving the situation, some organizations have sought help from outside professional service organizations — vendors and systems integrators that can produce and run the application.

One possible life raft has been computer-aided software engineering (CASE). Application backlogs in new systems written in the high-level C programming language are negligible, thanks largely to the growing variety of CASE tools.

"In a sense, both CASE tools and outsourcing are in their infancy," O'Flaherty says. "What we're seeing is something like sibling rivalry, and the next several years will tell the tale. I don't think CASE has made a significant impact on backlogs."

Unfortunately, older systems written in Cobol do not lend themselves to a quick rescue. O'Flaherty observes: "There is no effective way to transform those huge libraries of Cobol into new systems overnight."

At Mellon Bank in Pittsburgh, MIS director George DiNardo pins his hopes for reducing his Cobol backlog on restructuring code through a variety of programming tools and eventually moving to specification level coding.

"We are not going the 4GL route. We still have 18 million lines of Cobol code," DiNardo says. Among other products, Mellon, which sells software and services to 750 U.S. banks, uses Language Technology, Inc.'s Inspector and Recoder tools.

"For our environment, we've built our own programmer workbench, but we couldn't find a universal CASE tool," DiNardo says. "I just want specification level coding."

Specification level coding provides a system whereby a business analyst can actually code the application in a high-level language, and out of this occurs the Cobol code that interfaces with it, DiNardo explains.

Just maintaining Mellon's lines of Cobol coding takes 60% of the IS department's time, DiNardo says, with the other 40% devoted to newer systems.

"Right now, we have about 19 man-years of backlog," says George Fujiwara, vice-president of executive office systems and programming at Avco Financial Services in Los Angeles. "We typically receive 15 to 20 man-years of requests per year." Avco, a stem-to-stern IBM shop, is a consumer finance company that handles real estate loans, small business loans and third-party sales contracts. Fujiwara says his financial applications staff of 30 may be able to slice three to five man-years off his department's backlog this year, but only if no major developments arise.

Avco's field systems group, which tracks customer accounts and receivables for a network of 775 branch offices, is finishing three years of major development efforts. "Their backlog is 50 man-years right now," Fujiwara says.

MICHAEL MARSLAND

Yale's Batza: *"Our backlog is different from 10 years ago"*

Avco looked into re-engineering its Cobol-based code this past year. However, he says, "We didn't see a tremendous payback." Like other IS directors, Fujiwara hopes that CASE tools will play a greater role in reducing application backlogs in the 1990s, as will restructuring Cobol code.

"But a lot depends on the CASE decisions [our firm makes]. We are venturing into a major system development plan in 1990, to determine where to spend the money for the greatest benefit," he says.

At CSX Technology, Inc. in Jacksonville, Fla., company president Jack Cooper says today's application backlog is no longer "the major development" of six or seven years ago. Company focus has shifted to developing applications in "flexible modules" that extend the life of its present database.

"We're looking more toward new applications in image processing and artificial intelligence," Cooper says. One example is a just-installed imaging system, developed in-house from several vendors' products, that removes some 10,000 pages of paper-shuffling by allowing customers to send in orders via facsimile machine.

Several factors converged to erode CSX's years of backlog — better communication facilities, powerful workstations, large memory bases and hierarchical disk files that made optical storage possible, he says.

The firm is the IS arm of CSX Corp., a multibillion-dollar railroad company that was IBM's first customer for the 3090 Model S mainframe.

According to Cooper, the biggest impact on application productivity comes from a well-thought-out mission, a highly motivated team and shared values with the end users.

In the next 18 months, Cooper expects to be using workstations and CASE workbench tools that will allow seamless development of production systems. To maintain its massive Cobol base, CSX uses Telon from Pansophic Systems, Inc., a code generator that aids rapid prototyping and debugging.

Yale University is one place where the application backlog is much less of a problem than it used to be. The New Haven, Conn., university became a Focus 4GL shop in 1979, using Information Builders, Inc.'s database management system, says Richard Batza, associate director of management information services at Yale's Computing Information and Systems Organization.

"Our backlog is completely different from 10 years ago. We're in a new environment," Batza says. No longer are 300 Cobol translation requests backlogged in Batza's IS department, which employs two IBM mainframes to handle the bulk of the school's administrative processing in alumni systems, personnel payroll, general ledger and finance.

An important factor in reducing backlog, Batza says, is a well-trained user community willing to generate its own applications.

Yale is now experimenting with Aion Development Systems from Aion Corp. in Palo Alto, Calif. to streamline the information-gathering process surrounding new employees. Rather than filling out paperwork, workers in Yale's human resources department follow Aion's step-by-step guide and enter personnel data directly into a database.

"We are speeding up the process of getting information to our human resources system faster and more accurately," Batza explains. "We are just working with this now, but we might want to use it in other application development processes." •

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MINI POLL

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To do what we say we are going to do. We want to assure our users that what they got at the end of a project is what they wanted at the beginning. I also want to create an IS plan that is synchronous with the company's business plan, as well as modify the applications development process to include today's technology, such as CASE prototyping.
Thomas Cimino, *senior vice-president, information services at Great American Life Insurance Co., Los Angeles.*

To provide a stable computing environment, which would include MBS, CICS and Netview and to generally keep everything up. I also want to push for an AI shell — [IBM's Knowledge Tool].
Clarence Golson, *vice-president and manager of technical support at Amsouth Bank, NA, Birmingham, Ala.*

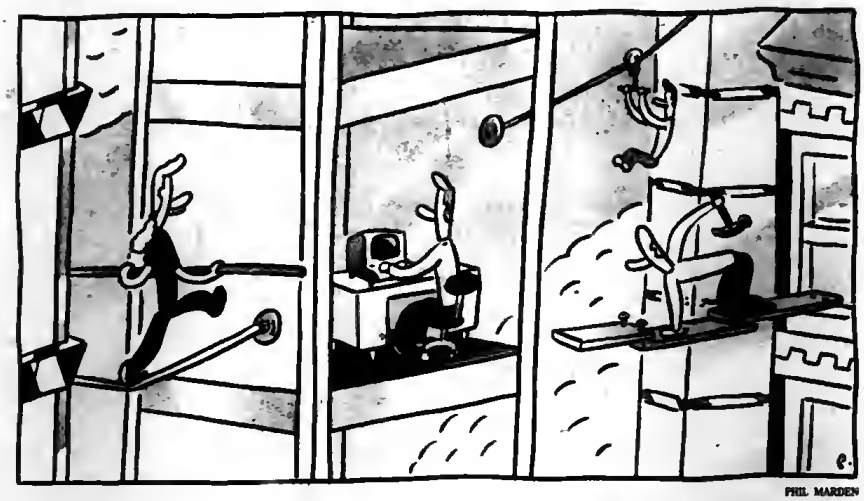
To not commit myself to things I can't deliver.
T. Ray Lollar, *vice-president, information services at Gold Kist, Inc., Atlanta.*

Getting everyone hooked up to everyone. Telecommunications. Another resolution, which has been at the top of the list for the last five years, is to continue to add capabilities while holding at the same expense. We want to implement DB2. We also want to continue to make third-party alliances and partnerships.
John Pitcock, *vice-president, technology services at Information Systems of America, Atlanta.*

To reduce my printed report output by 20%. Also, to have one-half of all existing Sperry workload transferred to Digital Equipment Corp. equipment in 1990.
Don Snyder, *vice-president of MIS at Tyson Foods, Inc., Springdale, Ariz.*

JODIE NAZE

Support for open systems builds piece by piece



PHIL MARDEN

BY AMY CORTESE

Let's get right to the point: 1990 will not be "The year of Unix" any more than 1989 was. But there are signs — some subtle, some dramatic — that Unix is plugging along toward wider acceptance.

With the easing of the tension between major Unix suppliers, a faint light at the end of the standards tunnel, the appearance of real reduced instruction set computing (RISC) products, the popularity of graphical user interfaces and, perhaps most important, a warming toward Unix by top business management, 1990 looks like a good year for Unix to make progress on its long march to the much-heralded new world of open computing.

Holy Wars ease

For the last two years, the machinations of the major Unix camps have often been accurately described in warlike terms. Recent negotiations among the players should help change the climate this year, however, making "unification" the watchword for 1990.

While an agreement that would standardize Unix is still a way off, many analysts predict that Unix suppliers in 1990 will continue to create alliances aimed at helping them survive in an increasingly open world.

One positive sign was the cooperative agreement among members of the Open Software Foundation (OSF), Unix International, Inc. and X/Open Consortium Ltd. in which the groups declared that they would work closely together for compatible Unix versions.

AT&T in particular seems to be taking unification to heart. By offering OSF members stakes in the Unix Software Operation (USO), Robert Kavner, president of AT&T's Data Systems division, is trying to wipe out licensees' lingering impressions that the Unix giant favors its own hardware systems. Talks among AT&T and individual companies continue, but many details still must be ironed out — not the least of which is structuring how such an operation would work.

Another dramatic sign is the collaboration by various Unix groups intent on developing key technologies. Digital Equipment Corp. and Hewlett-Packard Co., for instance, joined their respective technologies into the Motif graphical user interface. The Open Desktop environment was launched by a group of vendors including The Santa Cruz Operation, Digital Equipment Corp. and Ingres Corp. And a groundswell of joint academic and industry submissions has occurred in response to OSF's request for technology solicitations.

"This is typical of some of the things we will see in open systems," says Ron Fisher, president and chief executive officer of Interactive Systems, Inc., a Unix systems software house. "We are going through a fundamental restructuring of the business model people were used to with proprietary systems."

Even without a publicly owned USO, commonly agreed-on standards such as those espoused by X/Open and various government bodies may be enough to ensure a suitable degree of compatibility among the various Unix versions. Standardizing on interfaces to the operating system, for example, will ultimately allow flexibility in terms of the underlying kernel.

Standardization is an important issue to users such as Danny Wigley, a senior systems consultant at Du Pont Co.'s Fibers Division. He considers certification programs such as the branding offered by X/Open as safety measures for users. "Everyone will claim their products are open; it is necessary to monitor that," he says.

Despite the warning, many remain skeptical of the unification efforts, especially of the USO deal. "I just don't see all the various players getting together in 1990, or possibly ever," says Peter Kastner, an analyst at the Aberdeen Group, a Boston consultancy.

Pretty face

In 1990, another issue — the question of graphical user interfaces — will emerge as an important test facing Unix. Graphical user interfaces are considered important because they can provide an easy entree into Unix's notoriously complex operating system.

The first Unix graphical user interface products became available last year, followed by a trickle of applications that could take advantage of the friendlier gateway. The big question this year will be which graphical user interface approach becomes standard and gains the most widespread use.

Users consistently rate OSF's Motif, with its OS/2 Presentation Manager-like look, as the favorite; but other offerings, such as the Nextstep interface from Next, Inc., HP's New Wave and AT&T's Open Look, are still in the running.

The whole issue is something of a chicken-and-egg problem; the lack of a standard graphical user interface has slowed availability of software applications as developers wait for a winner to emerge. Industry observers agree, however, that a single standard is

needed if Unix is to compete against Presentation Manager for developers' resources.

The preoccupation with Unix standards and other contentious issues sometimes obscures the fact that the flow of Unix products is steadily increasing.

Right now, nearly every computer manufacturer is seriously marketing Unix-based products, which typically are paired with RISC technology. Big manufacturers are banking that the combination of high-performance, low-cost open systems will be irresistible for users, and that the pace of development is expected to quicken in 1990.

"Every day, we're seeing some new company coming out with a RISC-based machine that purports to have the same functionality as your mainframe," notes Larry Sikon, chief technical officer at DHL Systems.

The product flow should help Unix-based systems begin to meet their promised expansion to nearly 20% of the worldwide market by 1993, making it the fastest growing segment of the computer market, according to research company International Data Corp in Framingham, Mass.

However, others caution against such optimistic estimates, noting that Unix has been an annual disappointment that has yet to meet its projections.

Analysts note that Unix will have to compete against MS-DOS and OS/2-based PCs — both strong contenders. A huge installed DOS base and DOS "extenders" will stretch out the life of current systems, Kastner says, even without the waking of OS/2.

But Unix's struggle against better known operating systems may be aided by a most unlikely group — mainstream business. Unix shows some signs of growing beyond its academic roots.

The open systems movement coincides with, and may benefit from, a basic shift many corporations are making from traditional terminal-to-host style computing to a client/server model, taking advantage of powerful, low-cost workstations

Unix euphoria

The Unix market is expected to double by 1992

to offload more expensive host resources.

Du Pont terms this move to low-cost computing "opportunistic moving." "We're trying to bring these things together at the same time," Wigley says. Du Pont is putting together a standards-based framework for the 1990s, he says, "but in the meantime, we're leaning very heavily on our proprietary vendors."

Another importantsign of commercial interest in Unix is the emergence of corporate task forces that were created to investigate open systems and implementation strategies. At Du Pont, an open systems task force spawned a corporate Open Systems Office driving corporatewide strategy. ●

Crunch

CONTINUED FROM PAGE 4

department has participated, and the work atmosphere has improved. "You go through it and realize that you can go farther as a team. You can go beyond where you ever dreamt possible with a lot of encouragement from your fellow workers," he says.

Such unusual programs fit nicely into an important objective of Kane's: to make work fun. "I want people, when they come in the morning, to feel it's more like a hobby than work," he says. Staff members are encouraged to define and redefine their jobs in hopes of boosting productivity.

Although the emphasis is on people, technology is not ignored. Efforts continue to make existing Cobol code more modular and, thus, more reusable.

"We've learned that we can take advantage of many of the things we're [already] doing and just do them better," Kane adds.

Midwest Energy clearly is doing something right; IS turnover is less than 1%. Concludes Kane: "If you didn't have a new challenge every day, why come to work?"

Technology policy

Investing in technology and reorganizing IS structure are how Connecticut Mutual Life Insurance Co., based in Hartford, Conn., is dealing with tight times. Bob Lynn, senior vice-president and chief information officer, says the company has reduced its IS staff by 50% in the last two years and decentralized IS early in 1989.

Although Lynn expects 1990 budget cuts of 20% to 25%, he says technology spending will continue. Between 5% and 10% of savings will be reinvested in new revenue-generating products and services, he says. The downside, he says, is that the price to be paid for faster, more automated operations will include cutbacks in staff.

Since the decentralization, some 300 systems people have begun working side-by-side with business unit employees. Lynn says the reorganization was intended less as a cost-cutting measure than as a way to increase employee efficiency, produce products more quickly and increase margins and market share.

Along with decentralization, Connecticut Mutual has also instituted a project management system. Now, monthly reviews of status and profitability help company officials determine whether to discontinue projects or products that fail to meet schedules or profit margins.

To further link business units, Connecticut Mutual is installing Token-Ring local-area networks within its agencies and upgrading the speed and condition of communications lines.

Also under development are marketing and service applications for its IBM Personal System/2 Model 70s and 80s. A planned new configuration based on OS/2 will let insurance agents work on standalone functions such as estate and financial planning while at the same time access mainframe data over the network. Lynn says the benefits come from a major reduction in the time it takes to accomplish tasks and by freeing up programmer time.

Other ongoing technology improvements at the company include designing standards for projects and development environments, incorporating computer-aided software engineering tools and switching to IBM's DB2. On the horizon are increased use of expert systems and image processing.

Academic resourcefulness

Academic institutions are also feeling the tug of greater demands on its resources. Stu Warford, executive director of the information resources division at Pepperdine University in Malibu, Calif., says his coed private school is also wrestling with technology and budgets.

Over the past three years, computers have been installed in more than 80% of faculty offices, greatly increasing demand for training and support from the IS department, according to Warford.

To ease training burdens, the administrator plans to augment classes offered by IS trainers with computer-based training, videos and interactive media. While alternate teaching methods will initially cost money, they also will free up valuable — and expensive — IS staff time, he says.

Greater demand for support also means that Pepperdine now takes a harder look at potential PC support before making any purchases. Departments are encouraged to buy PCs only from approved lists of manufacturers that are willing to certify Pepperdine's IS department as an authorized repair shop with access to parts. Users who choose to buy hardware and software from vendors not included on the list have to furnish their own training and support.

"That really simplifies the process for us, because there's only a certain number of things that we have to worry about being ready to service," Warford says.

As another cost-saving opportunity, Warford enrolled the school in educational discount programs with vendors such as Microsoft Corp., Ashton-Tate Corp., Lotus Development Corp., Apple Computer, Inc. and IBM, among others. Software discounts average 50% off retail price, hardware about 30%, he says.

Never too small

The need to squeeze the most from IS dollars is not limited to mammoth multinationals and colossal conglomerates. Just ask Kevin Armstrong, a data analyst who runs a one-man IS shop at Northwest Marine Iron Works located in Portland, Ore.

Hired in November after a mid-year acquisition of the 1,500-employee ship repair and parts manufacturing firm by Southwest Marine, Inc. in San Diego, Armstrong has no staff and a modest budget that includes about $8,000 for supplies, support, training and other small expenditures.

To keep daily operations afloat, Armstrong has devised a two-part formula for IS success: use new technology carefully and develop educated, efficient users who work together and make the most of existing systems and tools.

The Portland facility uses terminals that are linked to a Digital Equipment Corp. VAX at headquarters in San Diego. In an attempt to improve reliability and efficiency, a fiber-optic communications link was installed in November.

Armstrong is also studying various networks to see if sharing peripherals and applications can further reduce costs. A relational database management system, fourth-generation language and new hardware and software also are on the planning board.

On the people front, Armstrong's plan involves educating users about technology while developing good relationships with them. The goal, he explains, is to create users who are knowledgeable enough to do basic troubleshooting and systems support for themselves.

He regards each user call as a teaching opportunity.

BILL O'CONNELL

Connecticut Mutual's Lynn *says technology and decentralization are key*

Armstrong believes that in the long term, such education will reduce training and support costs. To this end, he's considering establishing company "user groups" that would hold forums for passing along new information and skills.

A good team attitude is key in this kind of environment, says Armstrong, who besides encouraging equipment and knowledge sharing also goes out of his way to nurture good relations with users. Prompt response to calls, eliciting suggestions and regular contact go a long way toward fostering teamwork, he reports.

"After they're comfortable with me, I try to sell them on the big picture," he explains. "I make sure to get every individual's input on how to establish a climate of camaraderie."

Even with these measures, Armstrong knows he will probably need extra help and is considering hiring college interns from disciplines such as business administration, education and IS to provide extra support.

Even with more assistance, Armstrong doesn't expect to change his basic approach. "I attempt to enlist individuals' ideas on how they would see such a climate developing. I write them down, and I follow up on them from time to time." The approach may sound simple, Armstrong says, but it works. ●

10 tips for IS survival in the 1990s

BY DAVID LUDLUM

Ask 10 top information systems executives what skills will be crucial in their work in 1990 and beyond, and you'll get one answer: the ability to look, think and act like a general business manager. Ask them exactly what that means, though, and you get an ambitious agenda. How do IS executives go about adapting to their changing roles? *Computerworld* recently asked top IS executives to list what they considered to be the most important factors for success (or survival) in the coming year.

1) Build a competitive organization. In this tough and getting tougher business environment, savvy IS managers say the first must-do is to build an IS organization that can compete in a changing world.

Many IS executives still believe that information technology alone can create a competitive advantage. Wrong. For one thing, competitors can copy innovative systems, points out Bill Friel, vice-president of IS at Prudential Insurance Co. in Roseland, N.J.

Friel says he believes that a true competitive advantage comes from recruiting the right people and then motivating, training and retaining them. This crack work force can then continually seek ways of doing things better. The challenge of doing this will become even more pressing in the 1990s as the demand for highly skilled workers outstrips the number of people prepared to fill the positions.

2) Rethink business processes. The idea of doing things better is also critical. A good example is U.S. manufacturers, prompted by Japanese competitors, they have in the last decade redesigned manufacturing processes and boosted productivity. Today's IS executives are expected to help their companies do the same thing in the office and elsewhere.

Consultant Michael Hammer in Cambridge, Mass., calls this process "re-engineering" — rethinking business procedures with an eye toward simplification and greater customer satisfaction (see story page 16). One of his favorite examples is Mutual Benefit Life Insurance Co., which reduced the number of individuals who process an application for a policy from 19 to one.

Chuck McCaig, Mutual's senior vice-president of corporate services, says IS people should lead the re-engineering process. "What we need is a much better understanding of the work flow at the business level, not necessarily at the systems level," McCaig says.

Some top executives are looking for an even more insightful IS professional, he adds: "Someone with their head in the clouds and their feet on the ground. [IS people] who have a vision of what the technology can do but who also get enmeshed in the business so they can actually make those changes."

3) Focus on customers. In recent years, it has become rather fashionable for IS consultants to refer to in-house users as "customers." Besides creating confusion, the practice irks executives such as Michael Zucchini, executive vice-president and chief information officer at Fleet/Norstar Financial Group in Providence, R.I.

"I want my people to think of the things they can do to improve the services we provide to the real customers," Zucchini says.

IS managers cannot be content to solve just internal users' problems and assume only the users need to deal with the outside or "real" customers. "I want everyone thinking about the real customer, because things are so competitive," Zucchini adds.

Experts say that change-minded IS managers should always keep a company's real customers in mind.

4) Consider outsourcing. Tougher competition and profit pressures will force more IS executives to take a hard look at outsourcing functions and services that traditionally have been done in-house.

When a company's IS infrastructure reaches a certain maturity, users do not know whether the "iron" is run in-house or by a service company, says Gary Biddle, vice-president of information and systems technology at American Standard, Inc. in Piscataway, N.J.

"You should think of outsourcing if you're at that stage," Biddle advises. It could be that handling

Ludlum is a *Computerworld* senior writer.

	Actual
Programmer Wages	147,658
Fringe Benefits	17,480
Supplies	4,095
Telephone	9,580
Travel & Entrtnmnt	3,125
Total	181,938

	Budget
Programmer Wages	155,000
Fringe Benefits	18,790
Supplies	4,300
Telephone	12,000
Travel & Entrtnmnt	3,500
Total	193,590

certain functions and services in-house is costing you more than it should, that you're spending capital that could be used more effectively, he explains.

5) Develop a global perspective. Globalization will affect software development and other areas as much as manufacturing and other disciplines. But regardless of the activity, IS organizations will play a central role.

"If you're involved with international business, you have to understand the strengths you have in operating a telecommunications network around the world," says Robert Luft, who has held the top IS and international posts at Du Pont Co. and is currently group vice-president for chemicals and pigments. "That's the nuts and bolts of it, the glue that holds the IS environment together. If you don't have a competitive network, you have a real problem in your business."

The concern should not be only for markets but also for procurement and operations, as technology and politics make national boundaries less imposing.

Information systems managers might do well to take the advice of a popular political bumper sticker: "Think globally, act locally."

6) Foster teamwork. Looking outside the company does not relieve the need to address more traditional duties. In IS organizations and user departments, managers with the ideal blend of technical acumen and business savvy will be hard to come by. This reality means IS executives will have to bring the two perspectives together by forging partnerships with line managers.

At Bank of Boston Corp., for example, uniting business managers and IS will be "one of the biggest challenges of the 1990s," says Kavin Moody, the company's director of corporate information and technology. "We really want to deal with the expanding role of line management in leading." Line managers are in the best position to envision changes in the way information systems are used, and their leadership invests projects with ownership. IS managers should get to know their line managers.

7) Master expense justification. Gone are the days when cost overruns on systems development projects were viewed as consuming only "funny money" — the salaries of personnel that would be spent anyway. Increasingly, those overruns will be seen as hurting the profitability of products and wasting resources.

Today, more IS executives must deal with scrutiny from computer-literate top managers. That means more pressure to justify expenditures on systems. More than ever, management will be asking: " 'Hey, show me how this is going to make a buck on the bottom line,' " says Timothy Turnpaugh, executive vice-president of operations and director of MIS at Seafirst Corp. in Seattle.

Expect far less management tolerance for "soft" savings and benefits. Money talks . . .

8) Avoid information overload. Yes, it is possible to have too much of a good thing. The mushrooming volume of data is a major concern to William Dunn, chairman of Dow Jones & Co.'s Information Services Group, which runs the company's News/Retrieval Service. Dunn cites comparisons such as the fact that 300 years ago the average European encountered the informational equivalent of one issue of *The New York Times* in a lifetime.

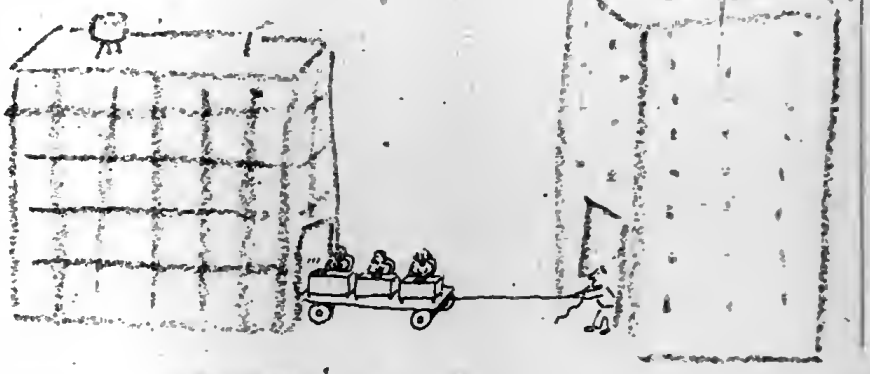
In 1990, the News/Retrieval Service will contain 200 billion characters of information; by 1995, it is expected to hold one trillion — the equivalent of 5,000 years of *The Wall Street Journal*. "And we're just a small part of it," Dunn says. "Nobody knows the scope of the pileup that's occurring."

The bottom line: IS managers must learn to be selective consumers of information.

9) Keep abreast of technology. While developing a better grasp of the business is still the key challenge, top IS executives also need a broad understanding of technology, says Patricia Wallington, vice-president and CIO of the information management division at Xerox Corp. in Rochester, N.Y.

In recent years, many managers have delegated that responsibility and emphasized general management skills. "Now, I think understanding how technology can help the business is more important," Wallington says.

10) Stay within your budget. Enough said. •



INTERVIEW

From cow paths to data paths

'Re-engineering' will help IS gear up for the future, consultant Michael Hammer says. His suggestion: Detonate, don't automate, outdated processes.

Consultant Michael Hammer has emerged as the industry's best-known evangelist of the notion that business process redesign will be the most important task facing information systems organizations in coming years. Hammer, president of the consulting, education and research firm Hammer and Co. in Cambridge, Mass., previously was a professor of computer science at MIT, where he also taught management programs for senior executives. Computerworld *Senior Writer David Ludlum spoke with him about his concept of re-engineering business processes.*

How do you define re-engineering?

Re-engineering is the radical redesign of all aspects of the business. The reason for this redesign is that the way our businesses operate today is not sufficient to meet the objectives that they have to meet. Our businesses were by and large designed for s different era. They were designed for the world of the 1950s and 1960s, which was s world of continuity and stability, when competition was relatively benign, where the rate of innovation was much lower than it is today, and where the real dominant ethos within the corporation was one of control.

Consequently, finance became the dominant player in the organization. Businesses were designed for low-cost execution, and that's what we've inherited. The trouble is, that design is grossly unsatisfactory today. It's not enough to be low-cost.

What else is called for?

Today, we live in an environment of high customer sophistication of all kinds, whether it's consumers or industrial customers, which means quality and service become very important. Traditional businesses were not designed for quality and customer service; it wasn't an issue.

We also live in an environment of extremely rapid change, which means adaptability and flexibility also are very important. These were not issues of traditional businesses. Lastly, we live in an environment in which innovation is s critical concern. The time from [product] conception to market is very short, a phenomenon not within the capabilities of traditional business structure.

What role does information technology play?

It is an essential ingredient in re-engineering. What we've inherited are businesses that were designed in an sge of information poverty. What businesses learned to do was cope. They designed all kinds of complicated processes to cope with the lack of information. Then along came the computer, and what we did was automate those coping mechanisms. What we should have done is detonate them. What we've done for 30 years is automate the past; we've paved the cow paths. Now what we have to do is jackhammer them up and rebuild from scratch.

Are you thinking primarily in terms of large corporations?

This is going to be the major challenge of large corporations, because in many cases, they are being victimized by start-ups. Start-ups are people who are able to approach their businesses with clean sheets, green fields. Start-ups are not just in software and biotech; Wal-Mart is a start-up — it's still run by its founder. In many cases, Japanese companies landing in the U.S. are starting up from scratch and are sble to perform very, very well.

Speaking of Japanese companies, do these ideas apply equally to other parts of the world?

I think they apply heavily to the U.S. and Europe. I think they apply less, perhaps, to the Japanese, partly because many of them are younger companies and partly because I think through a variety of things they've done over the years, they've avoided the complexities that our businesses have gotten involved in.

Can you cite some examples of re-engineering?

Sure, there are lots of them around. One of my favorites is Ford. Its accounts payable organization is in the process of reducing headcount by 75%. What it has done is go to a radically different approach based on invoiceless processing.

Instead of receiving invoices from its vendors and matching them against purchase orders and receiving documentation, Ford has told vendors that Ford won't accept invoices from them anymore.

Now what they'll do is pay on receipt of goods rather than receipt of invoices. And this requires an on-line information system so that at the loading dock, they can check to see whether an incoming good corresponds to an outstanding purchase order.

Mutual Benefit Life Insurance Co. has re-engineered the way in which it handles insurance application forms. Instead of going through five departments and 19 people, the application is handled by one individual who is responsible for the entire process from receipt to policy issuance and is supported by an integrated set of systems. The results have been major cost improvements and s dramatic reduction in the turnaround time.

LIGHT MECHANICS

Hammer *suggests redefining business problems*

Is re-engineering a new idea? Would something like Henry Ford's assembly line be an example?

That's s good question. Maybe it's not [a new idea]. I'll tell you what's special about re-engineering. One is, as I mentioned earlier, the search for radical improvement. The second is the need to think broadly. You don't look at your business problems as they're presented to you; what you have to do is redefine them. For example, when Ford fixed its accounts payable, it recognized that accounts payable is not s stand-alone activity — it's part of purchasing and receiving. If we stay within our existing boxes, we won't get anywhere. The third critical ingredient in re-engineering is the concious use of information technology as s mechanism to redefine the rules by which we operate.

What might a company or an individual IS manager do to start applying the concept of re-engineering?

The opportunities are all around. Actualiy, there are three issues: Finding specific opportunities, doing the right thing about them and then creating the environment in which this kind of activity will successfully proceed.

Finding the opportunities is not very difficult. What you have to do is look around and seek places where your performance is not what it needs to be. What a lot of people do is look at competitive benchmarks. You look either st your direct competitors and see how they're performing, which is one of the things that Ford did — it saw what Mazda was doing. Mazda's accounts payable organization had 1% of the people that Ford's did, and that caused Ford to recognize that there was a problem.

So you can look at competitors, or you can just look st best of breed. So that's one area. There are also areas where the marketplace is telling you that things are unsatisfactory — customers are complaining — or areas where you see an opportunity for breaking away from the pack, some high-leverage functions in your business.

And after identifying an opportunity?

Re-engineering requires a couple of things that are s little bit different from traditional systems activities. One is creativity. The other is change management.

In traditional systems implementation efforts, the first thing we do is go out and analyze the current operations and document them and turn them into functional specifications for the system to be built. That'a the last thing we want to do with re-engineering.

What we need to do is a different kind of analysis. We have to do not a detailed analysis but what I call an "intentional analysis," focusing not on *what's* done but *why* it's done. Then what's required is some real creative processes to discover different ways of doing things.

You've referred to "critical assumption surfacing." What is that?
This comes under that "getting creative" part. You've got an opportunity; how do you start thinking different thoughts about it? One thing to do is to put on the table assumptions about the ways you do business now and ask yourself, "Do those things still have to be true in the future?" Some of them will, but some won't.

In the Ford case, there was a fundamental assumption: We pay when we receive the invoice. If you stick with that assumption, there's not too much you can do with accounts payable. But if you nuke that assumption and ask, "When else might we pay?" In fact, Ford's going further. Ford is saying, "Maybe we should pay when we use the goods."

And then there's creating the environment.
Once you've come up with the dramatic new idea, your job's not done; your job's just beginning, because to introduce new ways of working is a radical change, and that requires a lot of management of people and the environment. You can't just walk in one day and tell everybody they're going to stand on their heads and spit nickels. You have to relate to their concerns, make sure that they're on board. Manage the stress and problems that will come with the change and make sure that the environment is redefined for the change — that includes compensation mechanisms and reward mechanisms and how you run an organization.

What's the most difficult part?
The hardest part of all, perhaps, is creating an environment in which re-engineering will succeed. Re-engineering is a very unpleasant experience to go through. Everything is turned topsy-turvy.

Once you've survived it, it's a wonderful situation. Jobs are better. The business is improved. It's a wondeful place, but you have to go through a hurricane to get there, and nobody wants to go through a hurricane because not everybody survives, and those who do are also battered around pretty badly.

So getting started with re-engineering requires real leadership. And we find that it requires real top-down leadership. Re-engineering almost never happens bottom-up. People come to work in the morning, they do their job and they go home at the end of the day, and it's not in their mandate to throw everything out and start all over.

What are the chief obstacles to re-engineering?
There are a lot of obstacles that get in the way. Inertia. Timidity. I've seen cases in which the senior manager has a vision and in which he decreases personal involvement and nobody else picks up the ball. One company told me that when it implemented a certain change, it was going to require behavior change and an attitude change on the part of a certain constituency — 125 people with an average of 20 years' tenure with the company. Those are the kinds of barriers you've got to take into account.

Do companies run into difficulties because changes are cross-functional?
Yes, you get into terrible problems because of fiefdoms, domains, responsibilities. Typically, somebody's ox is going to get gored real bad, somebody's function is going to be eliminated, going to be downgraded, going to be merged into somebody else's, and some boss is not going to be a boss anymore.

Do you foresee something further over the horizon, beyond this challenge of re-engineering?
Yeah, I would add something to it, and we've started to talk about it. The next wave, which some are working on in parallel, is re-engineering across corporate boundaries, which is re-engineering not companies but re-engineering industries.

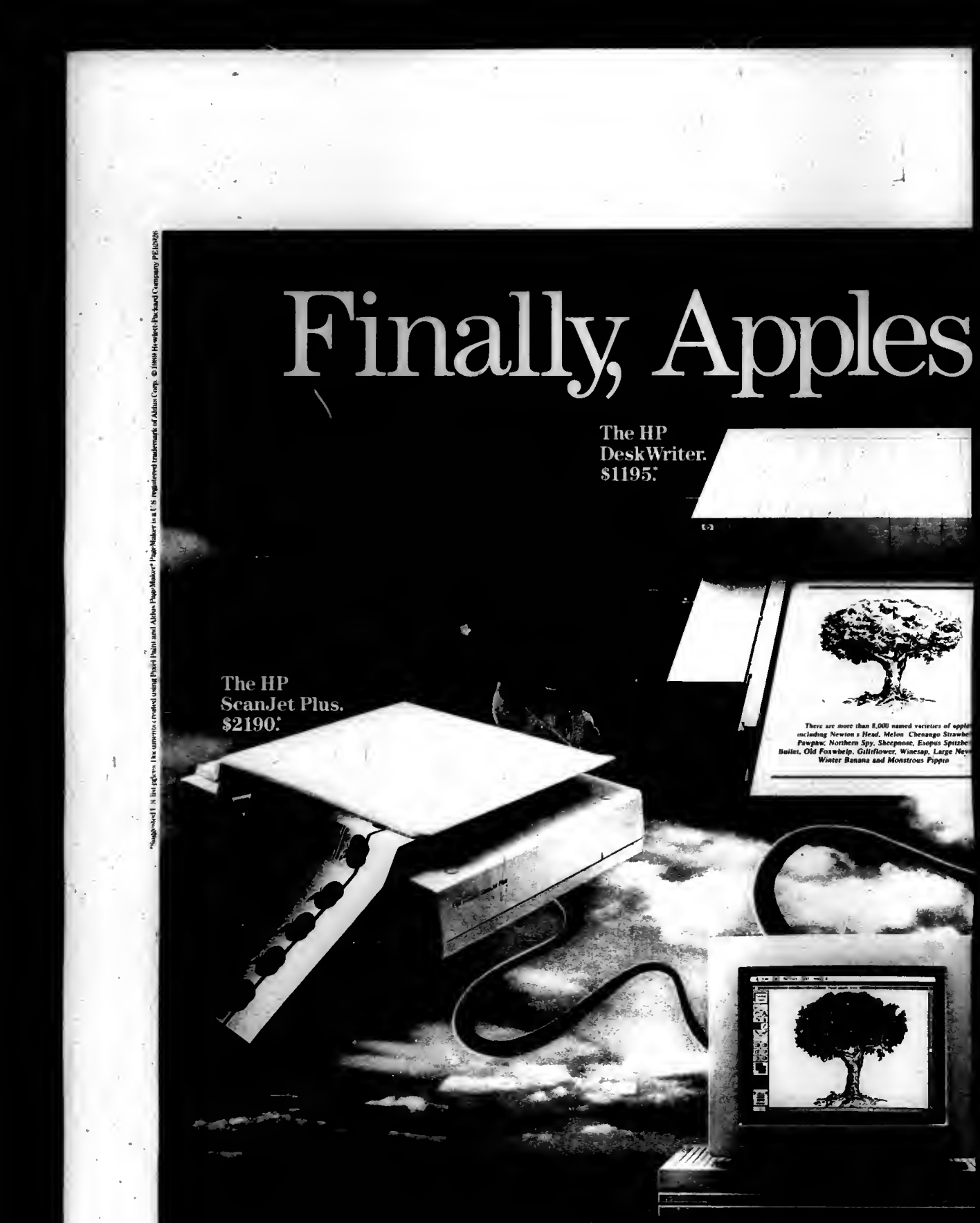
I'll give you a fantasy of where things might go, although it may turn out to be more than a fantasy. I go into an automobile dealer to buy a car, I give the dealer a check, and he deposits it in a clearinghouse. There is what I call a virtual industry linked together. Everybody in that distribution chain, from the steel makers to the parts manufacturer to the auto manufacturer to the trucking firm to the auto dealer, they all share a common system, common databases.

So when I buy the car, not only does the auto dealer know it, but the steel manufacturer knows it and the parts supplier knows it and they know who I am and the kind of car I bought, so they both know how to adjust their inventory levels and their production schedules and their marketing programs. Companies no longer need be self-contained entities that do everything within their own boundaries.

We need to look at creative ways of achieving the ultimate goal rather than just the narrow goals of the individual players. In the long run, this may be the way to compete; this may be important to cope in a truly global economy with an integrated Europe and powerful Japan. Companies may be too small to play in a global economy. We may need more of these alliances or virtual industries that will wring inefficiency and unresponsiveness out of an entire process rather than just within the subprocesses that fall within individual company boundaries. •

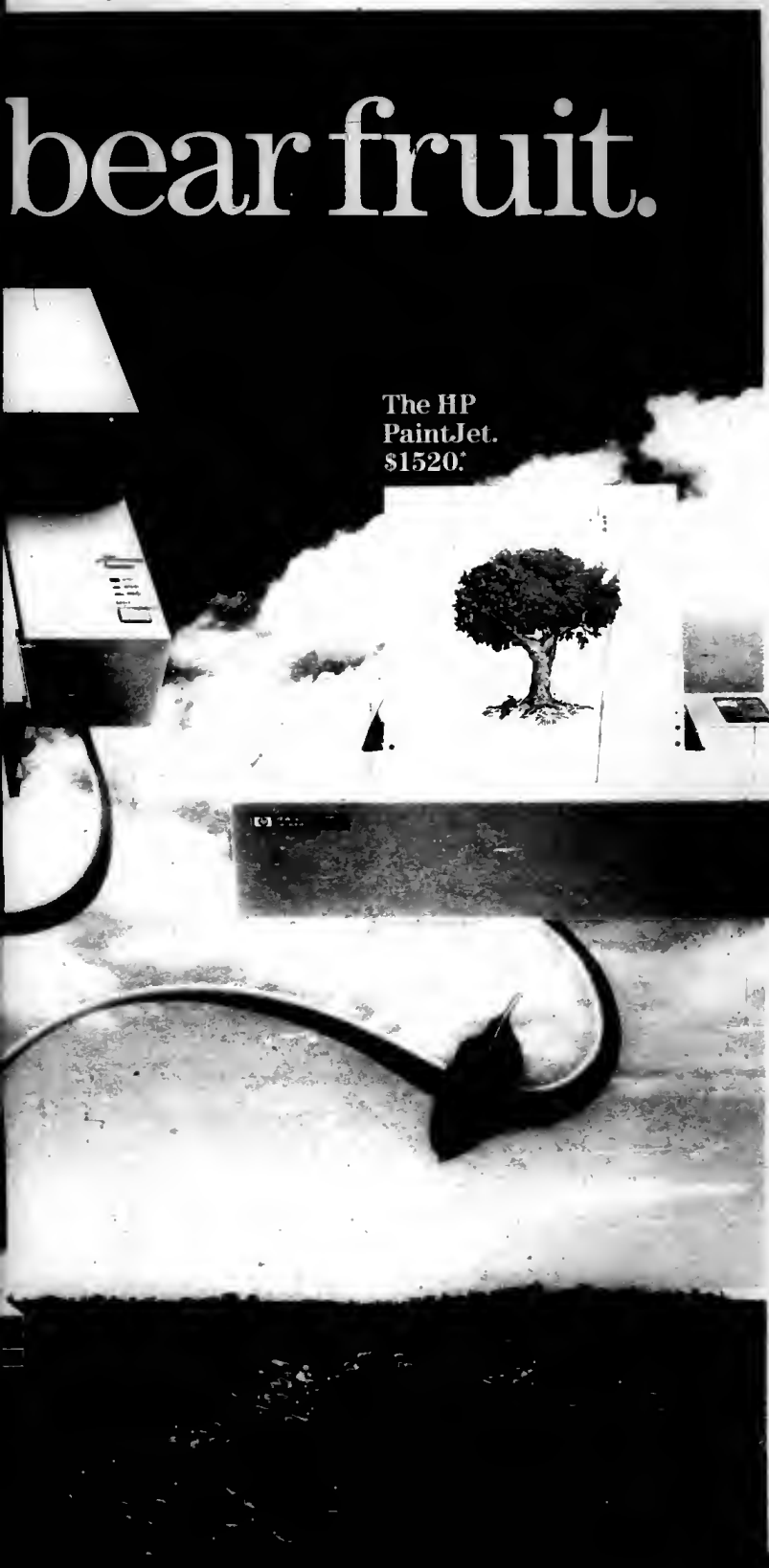
Finally, Apples

The HP DeskWriter. $1195.*



The HP ScanJet Plus. $2190.*

bear fruit.



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"Being serious is not a liability when you're talking about computers." — Buzz Luttrell.

The best of the worst. Compiled by Nell Margolis and Joseph Maglitta. Editorial cartoons by Rich Tennant. Illustration and design by Tom Monahan.

3rd annual DUBIOUS DISTINCTION AWARDS

This year's inductee into the Dubious Distinction Hall of Fame

"BUT WE DIDN'T REALLY *SELL* THEM — HONESTI IT WAS ONLY CASINO CHIPS, SEE?"

At Comdex/Fall 1989, Fujitsu turned a few heads (no easy feat in Las Vegas) by staging a "slave auction" at an after-hours party at the Tropicana Hotel. According to eyewitnesses, a dozen near-nude keno girls were dragged into the center of the room by a man and "auctioned off." When a girl was "sold," she was picked up and carried away kicking and screaming on the shoulder of a whip-bearing male. Red-faced Fujitsu later apologized, explaining that hired party planners failed to notify the company about the nature of the "entertainment."

HERE'S YOUR CRITICAL INFORMATION. DO YOU TAKE IT IN S, M, L OR XL?

letter from a Mamaroneck, N.Y.-based public relations firm began, "Getting editors to pay attention to a client can sometimes be a tricky task. We at Adtech believe that the best way to attract attention to our client . . . is by providing information to editors — information that is valuable to the reader of his/her publication." First item to emerge from the package: **a cartoon-printed T-shirt.**

EXCUSE ME, SOLDIER, MY PROGRAM TELLS ME YOU'RE GOING TO HOOK THAT SHOT

The **U.S. Army** chose a Silver Springs, Md., firm to develop a system that will be used to manage "quality of life" operations. The **"Morale, Welfare and Recreation Market Analysis and Programming Plan System"** will track such items as officers' clubs, bowling and golf.

A real promo photo, courtesy of Personal Support Computers

POLICY ACADEMY GOES ON-LINE

As the result of a service bureau's **computer error**, some 5,600 Newport, R.I., motorists with overdue parking tickets received summonses to court rather than standard warnings. Only about 200 of the scofflaws showed.

YOU DIDN'T SEE IT, YOU DIDN'T HEAR IT, YOU WON'T SAY NOTHIN' TO NO ONE, NEVER IN YOUR LIFE

Touting a "total solution," **Northern Telecom**, way back in October 1988, introduced the **Meridian Data Networking System.** Described as an all-purpose communications platform, the product's purpose was to interconnect a variety of local-area networks, hosts and workstations locally and over wide-area networks. This past September, Northern Telecom quietly discontinued the product, promising to announce an equivalent product based on an "industry standard" platform within 90 days. Soon after, the date was again quietly extended into early 1990.

THAT'S TELLING 'EM

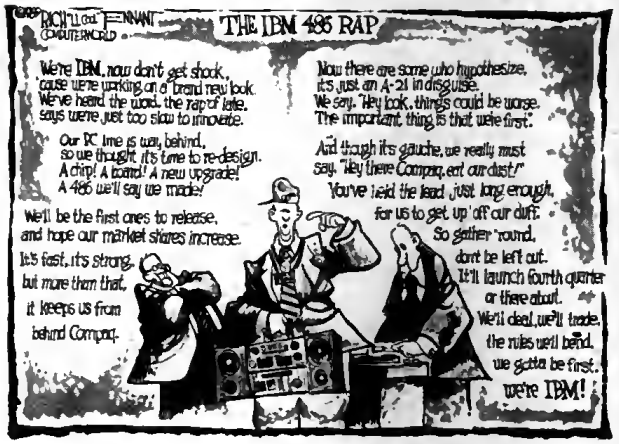
In "an attempt to achieve that marriage of name and nature" displayed in such fortuitous pairings as "the civil engineer named **I. Buckle** . . . the dentist **Dr. Fang**, [and] **Seaside, Ore.**," the Oregon Graduate Center for Study and Research changed its name to the Oregon Graduate Institute of Science and Technology.

HOW ABOUT SNEEZY, GRUMPY, SLEEPY, DOPEY, HAPPY, BASHFUL AND DOC?

Digital Equipment Corp. kicked off the year with seven new computers, the respective names of which were so number-ridden, interchangeable, confusable and ultimately forgettable that Chairman **Ken Olsen** admitted that even he could not keep straight which machine was named what, or why.

WE'VE HEARD THEIR NEXT PRODUCT IS CALLED "FAVORITE CASIO WATCH TUNES"

National Compact Disc has released a $15 CD made up entirely of computer game soundtracks. *Gameplay: Top Scores from Computer Action/Adventures* features 15 selections of computer-generated sound from such favorite games as **Zombie** and **Defender of the Crown.**



WORDS FAIL US (AS THEY APPARENTLY FAILED HP)

"Hewlett-Packard Co. today announced that six beam-lead Schottky diode bridge quads have been added to the HP beam-lead Schottky family . . ." (From a recent press release)

AND OF COURSE, WE WOULDN'T BE WHERE WE ARE TODAY WITHOUT THE INSPIRATION OF OUR CEO, IVAN BOESKY . . .

"To deal with its crisis in 1984, ADAC brought in **Q. T. Wiles**, a well-known high-technology turnaround specialist, as its chairman," said materials promoting the Turnaround Management Association's 1989 award to medical imaging systems provider **ADAC Laboratories**. The award was based on the organization's dramatic recovery from a $22 million loss in 1984 to three successive years at an average growth rate of 76%. One week later, **Miniscribe Corp.**, the company most recently chaired by turnaround specialist Wiles, revealed that massive, executive-level fraud occurred during Wiles' chairmanship.

Among the "nationally known participants" in the Turnaround Management Association conference that hosted the awards: junk bond king and celebrity defendant Michael Milken.

THAT'S REALLY TELLING 'EM

In an effort to better convey its corporate mission to putative customers, Oakton, Va.-based **Customer Service Programs, Inc.**, a developer of service quality training programs for high-technology firms, changed its name to **Sigma International, Inc.**

THAT'S REALLY TELLING 'EM, AGAIN

For reasons that we can't even begin to fathom, software company **Application Development Systems, Inc.** changed its name to **Centura Software.**

The 1989 Cobbler's Children Award goes to Sun Microsystems, Inc. The high-flier workstation maker that became a $1 billion company and a marketing legend in a few short years admitted that fourth-quarter earnings would dive because of billing and shipping snafus. The problem: An improperly installed mainframe wheeled in to run corporate business applications.

IF SUN MICROSYSTEMS KNEW HOW TO INSTALL ITS MAINFRAME, *WE* WOULD HAVE WON THE COBBLER'S CHILDREN AWARD

In late summer, **Tandy Corp.**'s Radio Shack stores installed electronic computerized cash registers for the first time. Prior to that, store clerks calculated Tandy purchases by hand.

WHY NATURE GAVE US TWO HANDS BUT TANDY JUST ONE ELECTRONIC CASH REGISTER

A Tandy customer reported that "from the clerks I've seen, they think the new system **stinks**."

ALL IN ALL, IT'S JUST ANOTHER BRICK ON THE BOOKS

Miniscribe, by the way, gathered the attention of both analysts and masons later in the year by admitting that it had warehoused and packaged bricks to appear as disk drives in hopes that it could artificially boost its poor financial results.

REAL HEADLINES

"Amadeus to cooperate with German Railways"
Sadly, Ludwig van Beethoven is still holding out.

"Thompson joins Heidrick and Struggles in Menlo Park"
Hey, pal, we all have problems at work. But you don't need to tell the world.

"Falcon training goes national"
So much for cynics who think the medieval arts are dead.
(From recent press releases)

"I bet you'd say/what could make me feel this way . . ." — photo courtesy of Bull H. N. Information Systems, Inc.

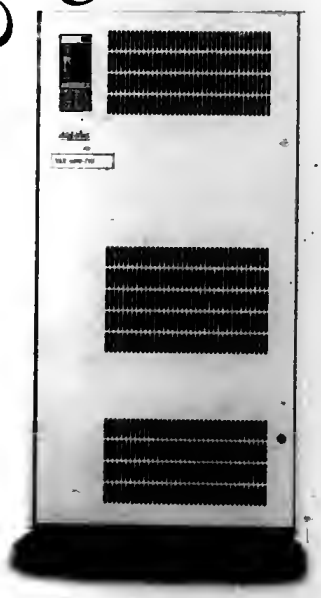
BETTER LATE THAN NEVER, SORT OF

The Japanese government awarded the patent rights to integrated circuit technology to **Texas Instruments, Inc.** after a 29-year wait.

FROM THE "SILENCE IS SILVER AND GOLDEN" DEPARTMENT

elecommunications is humming along nicely these days, thanks to Phone Spots, Inc. The Weston, Mo., company has patented a device that places recorded advertising messages in the four-second intervals between rings of a telephone. The first application is a state-run vacation center, which plans to place special coinless public phones in airports, hotels and convention centers. Callers can make free three-minute local phone calls but must listen to short advertising messages between rings until the phone is answered.

Want to see this computer grow over 10x more powerful?



VAX 6000 Computer
2.8 VUPs (10:30 a.m.)

You're looking at the same computer.

You're not looking at the same computing power.

Digital's VAX™ 6000 computer lets you expand to over 10X the power you start with. All in the same cabinet. In minutes. For range of growth, cost of growth and protection of your investment, nothing else compares.

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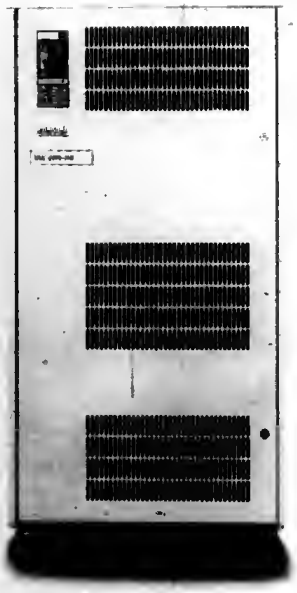
The VAX 6000 series also shares in the entire VAX family growth story:

- If you outgrow a single VAX 6000 system's power, you can form a VAXcluster™ that includes more VAX 6000s and other VAX computers for the power you need. You manage and access the cluster like one system because it is one system.
- The VAX 6000 computer is part of the industry's largest family of compatible computers. It extends from our $7,000 MicroVAX™ computer to our new VAX 9000 Mainframe. There's never a need to rewrite software when you grow from one VAX computer to another.
- The VAX 6000 system is backed by Digital's networking, renowned for how easy it is to set up and grow. And

digital™



Want to see it again?

VAX 6000 Computer
36 VUPs (10:42 a.m.)

now, with our NAS (Network Application Support), you can grow into a multi-vendor network, integrating at the applications level with other major vendors like IBM,® Apple,® and COMPAQ.®

All this adds up to lower growth costs, no matter which direction you want to grow – more power, more support for users, more storage, more networking.

It also adds up to a better protection of your computing investment. There's no simpler, more manageable, more affordable growth path for both hardware and software.

As you can see, the VAX 6000 computer system gives you lots of unique ways to deal with growth and change, so you can better manage the present and plan for the future.

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Digital has it now.

*VAX Unit of Performance. One VUP equals the processor performance of a VAX-11/780

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* The Wall Street Journal (1987) — "Survey of the Information Processing Marketplace."
* The Adams Co. (1988) — "Information Systems Management Study."

COMPUTERWORLD

Hard times

BY RICHARD PASTORE

Don't look for any Charles Dickens quotes from Wall Street's pundits; the coming year will definitely not be the best of times for the computer industry. For most firms, however, it won't be the worst of times. Instead, most Wall Streeters expect a mediocre 12 months marked by weakening demand across all sectors of the computer industry.

In general, like the Ghost of Christmas Past, the problems of 1989 will return to haunt industry vendors. The only difference, says Michael Geran, analyst at Nikko Securities Co. International, is that the now-bloodied firms are not heading into 1990 with the same naive attitude they carried into 1989. Look for the following:

• **Slow growth in large systems.** Hardware vendors can expect modest revenue growth, faster product cycles and cost-control difficulties. Pricing will be as competitive as ever, analysts agree, and vendors that have already bowed to discounting pressures will continue to stoop. For users this means good deals in the short term. But in the long term, it could mean a shakeout that will leave the sector with less vendors and users with less choices.

Some analysts use IBM and Digital Equipment Corp. as industry divining rods. "When they get healthy, I'm 110% sure the whole industry will turn healthy," says Jay Stevens, an analyst at Dean Witter Reynolds. But don't look for recovery to

Continued on page 32

Figuring out Europe 1992

Unification will bring big changes, but slower than expected

BY AMIEL KORNEL

When 1984 came and went without Big Brother, George Orwell fans perhaps felt a twinge of sadness mixed with relief. A date associated with the prophecy of a new age had passed uneventfully, just another signpost in history. By Jan. 1, 1993, the world may feel the same way about 1992.

The latter date has become synonymous with plans to unify Europe, a historical moment in which the 12 countries of the European Community (EC) are to finish merging their markets into a single transnational emporium.

The EC's Brussels-based Commission is targeting the end of 1992 for completing the adoption of 279 directives that were designed to bring down fiscal, technical and physical trade barriers between member states.

With all the media hype and water-cooler analyses, figuring out the real impact of Europe 1992 on IS businesses and organizations on both continents has become a much-muddied, even tiresome, undertaking.

"I get a stomachache from talking about 1992," confesses Franco Mariotti, senior vice-president and chairman of Hewlett-Packard Europe SA, based in Geneva. "You can only take so much of it."

TOMIO MITTO/REACTOR

Nonetheless, industry insiders and analysts agree that the 1992 plan will have a significant impact on computer vendors and their customers around the world. Indeed, senior computer industry executives say that virtually every aspect of their business — including manufacturing, human resources management, treasury and taxation, product development, pricing and bidding for public contracts — could be affected if all directives are passed and adopted in their current form.

Computer industry firms on both continents will face the dual tasks of expanding into major new markets and protecting any advantages they may have in their home countries. How successfuly companies handle these twin challenges will largely determine their

Continued on page 32

The information industry catapults into '90s

BY MITCH BETTS

The business of selling stock quotes, news services, credit reports, scientific abstracts, market data and a host of other electronic information services is experiencing phenomenal growth. But that's what you would expect in the information age.

The electronic information industry, now worth about $8 billion, continues to grow at an average annual rate of 20%, and 1990 will be no exception, according to industry analysts.

"Each year has been better than the last," says Margaret T. Fischer, vice-president in charge of electronic information at Link Resources Corp., a market research firm in New York. Fischer predicts that the industry will grow to $20 billion by 1994, although it is a relatively small market compared with other segments of the information technology industry, simply because a lot of information is still disseminated in printed form.

Analysts say that the hottest markets for 1990 are global financial data and marketing information that helps businesses make strategic decisions.

The domestic market is far from saturated with on-line information services. Room to grow exists in several vertical markets, such as health care and real estate, as well as in medium-size businesses, according to Gary H. Arlen, president of Arlen Communications, Inc., a research firm in Bethesda, Md.

In addition, many of the industry's largest players — including Dun & Bradstreet Corp., Mead Data Central, Inc. and United Press International — reportedly are exploring opportunities to serve the pan-European market with custom information products.

Not as easy as it looks

In fact, the information industry appears so attractive that at least one big acquisition is expected in 1990. "Almost every year, someone from outside the industry comes in, makes an acquisition, and then a couple of years later they divest it. They find out that the information industry is a harder business to be in than it looks on paper," says Maureen Fleming, executive editor of the "Information Industry Bulletin," a newsletter based in Stamford, Conn.

Typically, small companies take the risk in staking out new markets and offering innovative products and services,

Continued on page 26

Catapults

FROM PAGE 25

then the successful ones are gobbled up by the large information conglomerates. "The big are getting bigger," Fischer says.

Enticing the Baby Bells

Of course, there could be a full-scale takeover binge if the federal government allows the seven regional Bell holding companies to fully enter the information services industry. The cash-rich Baby Bells, eager to offer electronic yellow pages and other information services that could increase the traffic on their networks, can be expected to acquire any company with the necessary expertise.

In March 1988, U.S. District Judge Harold H. Greene ruled that the Bell holding companies can offer data transmission services such as electronic mail and information service gateways but not any of the actual information content.

Thwarted by Greene, the Bell holding companies' lobbyists have turned to a more sympathetic Congress. The U.S. House Subcommittee on Telecommunications and Finance is expected to unveil a "free-the-Bells" legislative proposal in January, but deliberations are expected to be lengthy and passage is not assured.

The industry also will be closely involved with another public policy issue — one that has been of vital interest for more than two decades and is just now on the verge of resolution. In 1990, Congress will resume work on the reauthorization of the Paperwork Reduction Act of 1980, including a section that will establish Uncle Sam's policy on the dissemination of government information.

The information services industry relies heavily on raw data collected by the federal bureaucracy (at taxpayers' expense), usually repackaging it in convenient formats with retrieval software. One of the industry's worst nightmares is having federal agencies disseminate that data at little or no cost and in direct competition with the private-sector vendors.

TERRY ALLEN

Getting their attention

In fact, fighting government competition was a key reason that information purveyors formed a trade association, the Information Industry Association (IIA), in 1968. "For 20 years we've been trying to get [Congress'] attention on this issue — and finally we've got it," says Kenneth B. Allen, senior vice-president for government relations at the IIA in Washington, D.C.

The House and Senate versions of the pending legislation establish a federal information dissemination policy with the following principles:

- The government has an affirmative responsibility to ensure that citizens have equal and timely access to federal information resources.
- The government should provide the information in the most efficient and effective manner, which could mean a government system, a private-sector vendor or a nonprofit system, depending on the individual case.
- There should not be monopoly control over government information.
- Proposals to create, change or terminate federal information services should be subjected to public comment.

- The legislation also establishes guidelines for federal agencies to follow when creating information services, including consideration of whether there are existing services in the marketplace.

The IIA supports the legislation on the grounds that it will foster a diversity of methods for disseminating government information. A prime example of how this works is the U.S. Securities and Exchange Commission's (SEC) Electronic Data Gathering and Retrieval System (Edgar), which is scheduled to be fully operational in 1993.

With Edgar, Wall Street analysts, corporate raiders, reporters and the public will have access to one of the world's largest electronic libraries — the database of 10-Ks, 13-Ds and other reports filed at the SEC.

Under the SEC contract, the key information broker will be Mead Data Central, the Dayton, Ohio-based purveyor of on-line databases Lexis and Nexis. It will sell wholesale subscriptions to the SEC filings — either a real-time feed or an overnight magnetic tape — at government-regulated prices to information vendors and the public.

"Edgar demonstrates how the industry can enhance public access to information, at a minimum cost to the taxpayer, and provide a diversity of products and services," Allen says. "Many of the principles that evolved during the course of Edgar are the ones that are now contained in the legislation." •

Information trends in 1990

Aside from legislative activity, Maureen Fleming, executive editor of the "Information Industry Bulletin," says that the information industry will be influenced by three major trends in 1990:

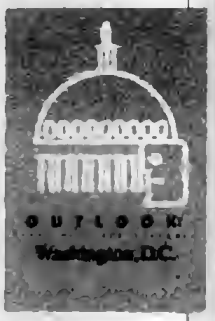
- Vendors that have historically sold on-line services for use on single terminals will begin selling them for use on corporate mainframes or local-area networks, allowing the customer to distribute the information throughout the organization in appropriate formats.
- More information will be distributed via compact disc/read-only memory (CD-ROM). CD-ROM and voice services are outpacing the rest of the information services industry, analysts say.
- Vendors will try to market services that help users cope with information overload. One technique is to come out with customized information products, such as newsletters tailored to the interests of each subscriber.

In fact, one key to the industry's future growth will be its ability to add value to its basic information products and make them easier to use. "It's a costly process," says Link Resources analyst Margaret Fischer. "But every year the industry inches along, making its products a little better."

MITCH BETTS

Hot technology issues await Congressional action

BY MITCH BETTS



Since the U.S. Congress, by its own admission, didn't get a heck of a lot of work done in 1989, many important issues dealing with U.S. technology's competitiveness and the rules of the information age have piled up, waiting for action in the second session of the 101st Coogress. To help information systems managers follow the second half of the game, here's a summary of five hot issues for 1990:

- **"Free-the-Bells" legislation.** Both the House and Senate will begin work on legislation that will unleash the regional Bell holdmg companies from the business restrictions imposed by the AT&T divestiture judgment. A bill beng prepared by the House Subcommittee on Telecommunications and Finance is expected to remove the court-ordered restrictions on offering information services and manufacturing equipment.

The political thrust behind the effort is twofold: an interest in reasserting congressional control over telecom policy and lobbying by the regional Bell holding companies. The bill may also have numerous consumer and competitive safeguards.

On the Senate side, Sen. Ernest F. Hollings (D-S.C.) has introduced his own bill allowing the holding companies to manufacture equipment, if they form separate subsidiaries.

- **Technology policy.** The high-tech industries will be watching President Bush's oext budget proposal to find out the degree to which Bush wants to fund the chip consortium Sematech, high-definition television, the proposed National Research and Education Network and other advanced technology initiatives. Whatever Bush proposes, Congress is likely to want more money for these popular programs.

Meanwhile, the computer industry will continue to push for a permanent extension of the research and development tax credit and antitrust relief for joint manufacturing ventures.

- **Computerized reservation systems.** The airlines, with their highly successful computerized reservation systems (CRS), were the pioneers of using information technology for strategic advantage. But critics say that the CRSs provide too much of a competitive advantage to some airlines, such as American Airlines.

The U.S. Department of Transportation is reviewing its current CRS regulations to see if more stringent rules are needed to prevent competitive abuses. For example, DOT is looking at the contracts between the CRS vendors and travel agents that lock out competing CRSs.

Meanwhile, three Republican senators have introduced a bill that will force the airlines owning CRSs to sell them to nonairlines. Sen. John C. Danforth (R-Mo.) explains that the divestiture bill — which has a fair chance of passage — is based on the argument that studies have shown that travel agents favor CRS-owning airlines in booking flights. This is not surprising, because CRS vendors require travel agents to book a minimum number of their flights on the system. Also, a CRS-owning airline can outmaneuver the competition by providing faster updates of its own flight information to the CRS and then boost revenue by charging other participating airlines a high booking fee.

- **Information policy.** House and Senate committees will resume work on a federal policy governing the dissemination of government information to the public (see story page 25), as well as legislation aimed at outlawing computer viruses.

The privacy issue isn't dead, either. The Bush administration's consumer advisor, Bonnie Guitoo, and Rep. Matthew J. Rinaldo (R-N.J.) are supporting amendments to the Fair Credit Reporting Act to prevent abuse of personal credit reports.

- **AT&T deregulation.** The Federal Communications Commission is undertaking a broad review of whether competition in the long-distance market is sufficient to further deregulate AT&T. In essence, the proceeding will determine whether AT&T should continue to be classified as a "dominant" long-haul carrier whose affairs must be heavily regulated.

Betts is *Computerworld's* Washington, D.C., bureau chief.

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   - 95 Communications Systems/Public Utilities/ Transportation
   - 70 Mining/Construction/Petroleum/Refining/Agric.
   - 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 90 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 00 Computer/Peripheral Dealer/Distr./Retailer
   - 75 User Other _____
   - 95 Vendor Other _____ (Please specify)

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   - 21 Dir./Mgr. MIS Services, Information Center
   - 22 Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. / Network Sys. Mgt., Dir./Mgr. PC Resources
   - 23 Dir./Mgr. Sys. Development, Sys. Architecture
   - 31 Mgrs., Supvr. of Programming, Software Dev.
   - 32 Programmers, Software Developers

   OTHER COMPANY MANAGEMENT
   - 11 President, Owner/Partner, General Mgr.
   - 12 Vice President, Asst. VP
   - 13 Treasurer, Controller, Financial Officer
   - 41 Engineering, Scientific, R&D, Tech. Mgt.
   - 51 Sales & Mktg. Management

   OTHER PROFESSIONALS
   - 60 Sys. Integrators/VARs/Consulting Mgt.
   - 70 Medical, Legal, Accounting Mgt.
   - 80 Educator, Journalists, Librarians, Students
   - 00 Others _____ (Please specify)

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   Types of equipment with which you are personally involved either as a user, vendor or consultant.
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   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Local Area Networks
   - F No Computer Involvement

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   - 95 Communications Systems/Public Utilities/ Transportation
   - 70 Mining/Construction/Petroleum/Refining/Agric.
   - 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 90 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
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   - 13 Treasurer, Controller, Financial Officer
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   - 51 Sales & Mktg. Management

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   - D. Communications Systems
   - E. Local Area Networks
   - F No Computer Involvement

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They still start companies, don't they?

Venture capitalism to take on a lean, mean look for the new decade

WARREN GEBERT

BY JEAN BOZMAN

Venture capitalism for computer firms in the 1990s will have a different face than it did in the 1980s — starting now.

A decade after the birth of the microcomputer in a Silicon Valley garage, greater risks and profit pressures are shrinking the pool of venture capitalists who invest in emerging high-tech. For many would-be entrepreneurs, start-up money will be hard to come by — and it will come with plenty of purse strings attached. That's because the price tag for first-round funding has quadrupled to $4 million.

However, existing companies will probably face fewer problems finding money for expansion or second-round financing. Software companies, in particular, will find it easier to attract start-up and expansion money.

"The outlook for software remains bullish," says Frank J. Florence, a vice-president at Dataquest, Inc. who directs the San Jose, Calif., research company's executive and financial program. "But more of the investments will be follow-on money, as venture people are forced to take money away from early-stage starter companies and put it into later-stage deals."

As a result, many new firms will be turning to outright acquisition as a way to raise capital — and to end the marketing and distribution problems that often plagued the start-ups of the 1980s.

Of course, new ventures will continue to spring up around Silicon Valley and across the U.S. But experts say the days when a business could be born in a garage have probably ended, with small start-ups falling victim to tight capital and a fast-moving market.

Financial analysts say that more venture money will go into expanding existing firms because investors want to see working prototypes before they invest — and because the amount of cash needed to field a successful product has risen, along with inflation.

Over the long term, experts say that the new tighter fiscal atmosphere could influence the types of computer products that eventually make it to market a few years down the road. Already, the trend is clearly away from hardware firms — the hot-ticket investments of the '80s — to software firms that leverage customers' hardware investments by boosting worker productivity.

The very profile of the investment community is changing as the 1990s approach. The number of small venture capitalists has begun to drop, a trend that analysts predict will continue over the next few years. Currently, some 650 venture-capital firms operate in the U.S.

Furthermore, the days when limited partnerships were a primary source of seed money are gone. "Traditionally, venture capitalists were wealthy individuals who would invest their money in a general fund, much of which was invested as seed money for start-up companies, including my own," says Mitchell Kertzman, chief executive officer of Computer Solutions, Inc., a Burlington, Mass., applications software manufacturing firm.

Taking their place in distributing funds are large pension funds and foreign investors.

"We're undergoing a long process of consolidation, much like the industries we invest in," says Bandel Carano, a general partner in Oak Investment Partners of Westport, Conn., which has $335 million invested in its four funds and is expected to add $20 million this year.

"Two decades ago, this business was in its infancy," Carano says. "Ten years ago, less than $3 billion was invested. Now, the number's more like $30 billion."

Carano says be believes that half of all U.S. venture firms are running into poor results — and that some may cut bait in the '90s. Others disagree with Carano's numbers but concur that the number of big players is falling.

Seeds drying up

"There has been a real drying up of seed funds for our industry," says Kertzman, who is also chairman of the American Electronics Association (AEA), a Washington, D.C.-based industry association with 3,300 member companies in the hardware and software business.

Kertzman says his own company, which started with $990,000 in early financing, might not have been launched in today's changed financial climate.

One reason for the exit of small investors was the 1986 change in the federal income tax law, Kertzman says. The new code reduced tax breaks that rewarded the small investors with the promise of capital gains in exchange for the risking of limited partnerships' capital.

Large pension funds are already becoming a more popular source of venture funds than just five years ago, the heyday of venture start-ups. Part of the reason for pension-fund participation is the vast amount of money handled by the funds — often in the hundreds of millions of dollars.

Kertzman says be believes that over the last four years, these growing investments by large tax-exempt pension funds have come at the expense of smaller players discouraged by the capital gains tax.

Continued on page 28

Bozman is *Computerworld's* West Coast bureau chief.

"These megafunds manage hundreds of millions of dollars, instead of tens of millions, and that's why they tend to invest larger amounts of money at any one time," Kertzman explains.

The AEA is battling back, urging Congress to reform the current capital-gains laws to promote venture capitalism on a smaller scale.

The changing financial landscape has put new pressure on venture capitalists themselves, who have responded by being more selective about which firms get funded and which ones do not.

Picking a winner

It is more important than ever to pick the best prospects from a crowded field of start-ups, says Rick Magnuson, general partner at Menlo Ventures in Menlo Park, Calif. To help it evaluate new opportunities, the venture capital firm periodically brings in consultants and industry experts from places such as MIT, Stanford University and the University of California at Berkeley, he says.

Like many venture firms, Menlo Ventures tries to reduce its overall risk by balancing investments. Currently, the firm invests approximately 25% of its funds in computer companies, 25% in communications firms, 25% in health-care companies and the remaining 25% in other areas.

Among today's investors, software is one of the hottest high-tech areas, especially firms focusing on database management systems, object-oriented software and computer-aided design and manufacturing products.

In general, investments in hardware and semiconductor companies have cooled off, because of the higher costs of entry into those capital-intensive businesses.

Overall, financial risks have risen dramatically since the heady days of venture spending in the 1980s, industry observers say. Today, each roll of the venture capitalist's dice costs more money.

According to an AEA survey in October, the average amount invested into a fledgling start-up in 1989 was $4 million or more — compared with less than $1 million in the early 1980s.

These trends are hardly helped by Wall Street, which listed just 35 initial public offerings (IPO) last year, compared with 120 IPOs in 1983. The stock-market crash of October 1987 didn't help, either.

"Confidence in high-tech on the Street is at an all-time low," Florence says. "There have been too many big surprises in the last few years, and they've been blowouts, not flat tires. Superstar firms have tumbled, and it's caused a cascade."

High roller rollover

Other analysts remark about recent losses sustained by high-profile computer companies, notably former high-fliers Ashton-Tate Corp. and Sun Microsystems, Inc. in late 1989.

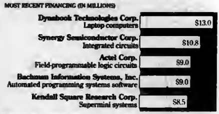
What will the 1990s bring to venture capitalism? Money, and lots of it. But the money will come from bigger — and more varied — players.

Also, because the millions of dollars invested will buy less as time goes on, small start-ups should look more to private funding to get off the ground, experts say.

Tough times are ahead for the start-up — that's clear. However, those firms that manage to prove their technology, and to survive their product's first test-flight, can expect to find money that will really let them soar. ●

High tech, high finance

Largest computer industry venture investments for third-quarter 1989



Asian investing

A new and important feature on the investment landscape is an increase in Asian funding, particularly Japanese, being offered to U.S. computer firms.

Canon, Inc., Kawasaki, Nippon Steel, Sony Ltd. and Fujitsu Ltd. all have active venture operations in the U.S. Fujitsu, for instance, holds 38% of the shares issued by Poquet Computer, a Sunnyvale, Calif., maker of handheld personal computers, while Canon invested heavily in Next, Inc.

"The Japanese bring the long-term perspective," says Frank J. Florence, a vice-president at Dataquest, Inc. "They're willing to lose money for a while."

The business dynamic underlying many Japanese investments can be seen by the recent flurry of investments made by Kubota Ltd., a $5 billion farm-machinery giant. With Japan's domestic market leveling off, Kubota looks to the U.S. both as a consumer nation and as a source of high-tech innovation.

At first, Kubota kept to its tractors, assembling them in Georgia and California. But the firm has sought diversification in the electronics business, explains Ken Nakao, general manager of Kubota's Santa Clara, Calif., office.

Its most recent plans include Ardent Corp. in Sunnyvale, Calif., now called Stardent Computer Corp. Kubota aims to manufacture all Stardent machines in Japan, but it also retains the right to manufacture any hardware and software products developed by its U.S. business partners, he explains. That way, Kubota gets to profit directly by reselling the products in Japan and other parts of Asia.

Another active Japanese industrial giant is Fujitsu. Fujitsu's investment in Poquet, aimed at the low end of the PC market, neatly balances the company's long-standing 49% investment in Amdahl Corp., which manufactures large-scale IBM-compatible mainframes.

Industry observers say they believe Japanese companies will continue to invest heavily here, both to profit from the start-ups' success and to gain knowledge about Silicon Valley techniques by competing down the street from U.S. computer firms.

Industry analysts expect Korea and China to be the up-and-coming sources of Asian megamoney. Sources say Chinese investors from Taiwan are already buying U.S. investments, and a Taiwanese group bought Wyse Technology, a California maker of terminals and PCs, for $156.7 million in December [CW, Dec. 18].

JEAN BOZMAN

MINI POLL

What would you like to see happen in the IS industry in the coming year?

The one thing that I really want to see happen is an absolute commitment by vendors to support an open systems architecture. We need to be able to build systems in Unix, for example, without regard to the platform. I want to see vendors do everything they can to support portability in software.

Ron Ponder, *senior vice-president of information and telecommunications systems, Federal Express Corp., Memphis.*

I'd like to see a healthier, more structured software applications industry. What we have today is continual shakeouts because of all the mergers. There's always concern that you'll commit to a smaller software firm that will run into this type of difficulty — like Cullinet.

I'd also like to see a more vigorous U.S. supercomputer industry. Large users have but one domestic alternative; I'd like to see more.

James Sutter, *vice-president and general manager of information systems, Rockwell International Corp., Seal Beach, Calif.*

I think there's going to be a broad upheaval in information systems — from the human resources point of view. People are used to doing their jobs in a certain way — that is, overall jobs are broken up into individual components.

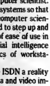
With new technology, however, those lines will be blurred. Customer service representatives might be inputting inventory information just because the tasks are integrated through [the use of] computers. That means that people in the different areas will need to have a broader understanding of company business. I'd like to see enhanced training and education programs to teach people new skills and more about the ones they already have. I'd like to erase the attitudes that say each job is separate from the next and develop a team approach to getting business done.

Honk Willen, *director of corporate information systems, Becton-Dickinson & Co., Franklin Lakes, N.J.*

We need to improve and enhance our software investments through portability. Return on investment should be fully realized — irrespective of the hardware platform. Our five-year plan for '90s is built upon the open systems concept.

Also, we're looking for improved price/performance in telecommunications. Telecom is becoming a bigger piece of our budget.

James Marston, *senior vice-president of IS, American Presidents Co., Oakland, Calif.*



First, we have to recognize that the nature of the work force will change in the '90s to be made up to a larger degree by women, minorities and part-time workers. Also, I think we'll see that the level of sophistication of individuals — end users — generally will not be that of a computer scientist. We've got to change our systems so that you don't have to be a computer scientist to use them. We need to step up and implement the concept of ease of use in everything from artificial intelligence down to the ergonomics of workstations.

We also need to make ISDN a reality — integrating voice, data and video images.

Finally, we've got to take dramatic steps forward in the area of standards. All vendors should understand and embrace and drive forward all standards; Unix, for example, is very confusing. Boeing, in particular, is interested in the MAP/TOP and telecommunications standards.

Mike Hellman, *president, Boeing Computer Services, Seattle.*

KIM NASH

"Today's application backlog is such a nightmare, it'll take more resources to fix it than even IBM has."

–a software developer

"You're right."

–IBM

Announcing AD/Cycle: The first fully integrated, total SAA, start-to-finish working environment for creating and maintaining applications.

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With computers humming along at 100 million instructions a second, it seems insane, but it's true:

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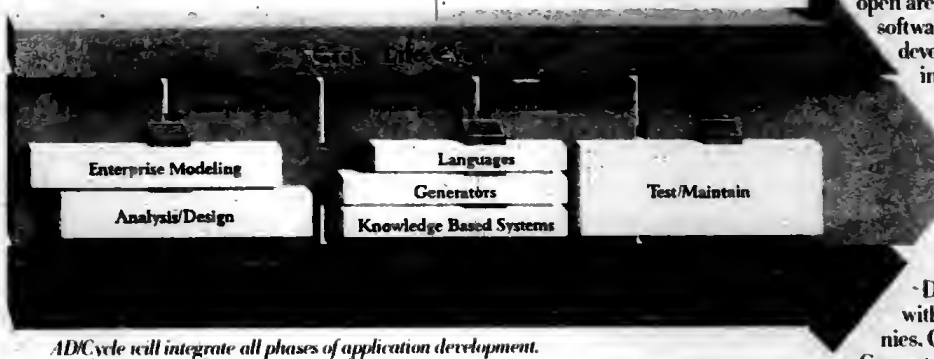
It's a bigger problem than IBM, or anyone else, can handle alone. So our solution, AD/Cycle, teams IBM with some special IBM business partners.

And because you can't wait, many AD/Cycle products are available now.

But before getting into who's offering what, let's look at what AD/Cycle is, and why it is *the* development solution for the '90s.



AD/Cycle will integrate all phases of application development.

With AD/Cycle, planners and programmers can speak the same language.

The Right Idea.

To begin with, AD/Cycle is a framework that gives the entire development cycle something it never had before: a consistent set of standards. Within it, all phases of the process (see diagram) can be coordinated.

It's an arsenal of tools, too: CASE tools for planning, analysis and design, a variety of 3rd-generation languages, application generators, knowledge based systems, testing and maintenance tools, plus cross life-cycle tools that tie everything together.

And, because a real obstacle to getting applications done right is getting people to communicate, AD/Cycle also offers a repository for sharing information: details about a company's structure and methods, expressed in a uniform way to keep executives and programmers on the same wavelength.

Thanks to SAA, these pieces not only will fit together but can produce code for multiple IBM operating systems. And you can use as many, or few, AD/Cycle tools as you need.

The Right Tools.

AD/Cycle has too many tools to describe them all, but here are some highlights.

Along with products from IBM, key elements of AD/Cycle are coming from BACHMAN Information Systems, Inc., Index Technology Corporation and KnowledgeWare, Inc.

Each is a leader in CASE technology, with products that reduce years to months, and months to days.

Their sets of tools will combine enterprise modeling, validation of models, data structure analysis and more, all using the graphical interface of SAA.

In addition, new releases of IBM Cross System Product (our application generator) will run on both OS/2® EE workstations and hosts. Through CSP, many AD/Cycle tools can build applications for all SAA systems: OS/2, OS/400,™ VM and MVS.

And because AD/Cycle is an open architecture, many other software vendors are creating development tools that will integrate with it, taking full advantage of IBM's repository manager.

Right Now.

To help you get going with AD/Cycle, IBM's Systems Integration Division is joining forces with leading service companies. CAP Gemini America, Computer Power Group, Computer Task Group and GE Consulting will be working with us to assist you in planning, training and implementation.

OS/2 EE versions of AD/Cycle tools will arrive through 1990, but you don't have to wait to get started. Many tools are available now, and with excellent track records.

All AD/Cycle products will have the easy-to-use, SAA graphical interface.

Response to AD/Cycle, from both vendors and users, has been overwhelmingly positive. Clearly, it represents the future of application development.

So for you, the question isn't if, but when. And when is now. To get started with AD/Cycle, call your IBM Marketing Representative today.

IBM

Hard times

CONTINUED FROM PAGE 25

happen in 1990. Stevens does not expect DEC to get back on track until fiscal 1991, when its new products start showing up on the bottom line. IBM will flounder until calendar 1991.

Meanwhile, IBM's revenue will be slightly higher in 1990, thanks to easing pressure from the overseas dollar, says S. G. Warburg & Co. analyst David Wu.

For IBM, "The good news is that its 3390 [disk drive] problem is behind it; the bad news is that AS/400 momentum has peaked," Wu says.

The company's plan to cut 10,000 employees, announced in November, will not be enough to turn things around, Wu says. More cuts are necessary, and IBM must update its hardware lineup, he contends.

- **Meltdown in minicomputers.** The minicomputer market will continue to disintegrate, Wu predicts. But drastic staff cutbacks will help stabilize bleak houses such as Wang Laboratories, Inc. "They won't be as desperate," Wu says. "You had a lot of desperate companies this year doing desperate things like giving products away." Longtime users should be able to sleep a bit better knowing that their vendor isn't going to give away the farm.
- **Slower PC growth.** Though it remains the fastest growing sector, personal computer hardware will take a licking in 1990 because of slowing demand. 1989's growth levels of 30% to 50% will not be repeated. Instead, the average growth prediction for all PC makers is 15%. Well-positioned firms such as Compaq Computer Corp. and Apple Computer, Inc. are expected to post growth in the upper 20% and lower 20% range, respectively. But the PC slowdown could put a crimp in these companies' development efforts, which could mean fewer innovative products for users down the road.
- **Softer software sales.** In the face of saturating markets, even the powerhouse software sector is losing steam. Analysts are calling for 10% to 15% growth worldwide in 1990 — "slower but still reasonable," says Montgomery Securities analyst David Bayer.

Several observers who scout demand trends picked database management system software as the sector's star performer for 1990. Companies specializing in DBMS — Oracle Corp. and Sybase, Inc., for instance — are expected to outperform the market with greater than 20% growth.

But look for 1990 to be a tough year for traditional mainframe software utilities such as sorting and security, analysts note. "Companies that are pure systems software will falter," Bayer says. Since users are demanding more from their software vendors, "firms that have value-added tools tied to the data processing world will do better."

On the other hand, PC software should exceed 20% growth. In particular, Bayer expects a very good year from Lotus Development Corp. and Microsoft Corp. on the strength of product introductions. Lotus will unveil 1-2-3 versions for OS/2, Unix, IBM mainframes and DEC VAXs, Bayer says. Meanwhile, Microsoft will gain strength from Windows and OS/2 versions of its Word software.

- **Semiconductors mostly semicomatose.** The semiconductor industry will have at least one artful dodger in an otherwise moribund 3% growth year. With its 80386 chip gaining market share, Intel Corp. will chalk up 22% growth, predicts Drew Peck, an analyst at Donaldson Lufkin & Jenrette.

But the outlook isn't as rosy for firms such as Motorola, Inc., Texas Instruments, Inc. and National Semiconductor Corp. Because of their large size and weak product portfolios, Peck expects these companies to match or underperform the sector's average growth.

Peck also predicts 1990 will be the year chip consortium U.S. Memories "falls flat on its face." The consortium of chip suppliers and computer vendors is seeking to stabilize and fortify the U.S. semiconductor trade. Vendors wishing to join must cough up $50 million each in capital and agree to future chip purchases. However, separate pacts among Motorola and TI and customers Apple, Compaq and Sun Microsystems, Inc. have effectively "cut the legs out from under U.S. Memories," Peck says, because these deals do not require the $50 million sign-up fee.

Such pacts will help stabilize the volatile, cyclical market for semiconductors, which should in turn mean less mercurial hardware prices for users.

Judging by these predictions, 1990 will mark another chapter of hard times for the industry. But most observers join Wu in "praying that the worst is behind us." •

Europe 1992

FROM PAGE 25

continued success — and survival — in a new global economy, industry sources say.

A major goal of the directives is to sharpen the competitiveness of Europe's information technology industry. EC planners hope that local computer vendors will cash in on a surge in demand for information systems from firms in all sectors that are scrambling to seize new opportunities.

"People are basically getting ready for a more competitive world," Mariotti says. "To be prepared, they have to improve their design cycle, their product quality, their testing — all those things are sources of investment in high-tech products."

High hopes

The excitement about 1992 is fueled by the fact that a decade-old trend toward globalization is finally gaining enough momentum to become a day-to-day reality for many businesses.

"All of a sudden, we're seeing that any company operating in Europe is becoming international," says Felix Bjorklund, vice-president of communications and external affairs at IBM Europe's headquarters in Paris.

Like a blast of the jet stream, the real and imagined benefits of globalization are sending U.S. businesses flying across the Atlantic in pursuit of foreign sales. Attracted by Europe's 323 million well-educated — and well-paid — consumers, companies from all sectors are flocking there in greater numbers.

James Gallatin, an international trade lawyer at Gaston & Snow in Washington, D.C., says he is seeing a dramatic increase in the number of firms asking for help in developing European business opportunities. Further, he adds, they are making the transoceanic move earlier in the life of their companies.

On average, Gallatin says, by the time his clients reach revenues of $10 million, they already earn half their sales in Europe and in the Far East.

Although the pace of globalization is quickening, the ballyhoo surrounding 1992 is raising expectations to such heights that disappointment may be unavoidable.

European computer vendors, for example, hope to finally get a leg up on U.S. competitors currently dominating their markets. It is hard to imagine, however, how European companies will reap greater rewards than foreign rivals already operating locally. Companies surviving the heat of a more aggressive and open marketplace will no doubt be strengthened, too.

For example, IBM — one of Europe's biggest employers and taxpayers — estimates that about half of the commission's directives could benefit the firm or its customers. Thirty of the directives could have a major impact, according to Bjorklund.

He cites faster distribution of IBM's products and easier formation of limited cooperation agreements with other European firms as examples of important ways in which the company's business could change.

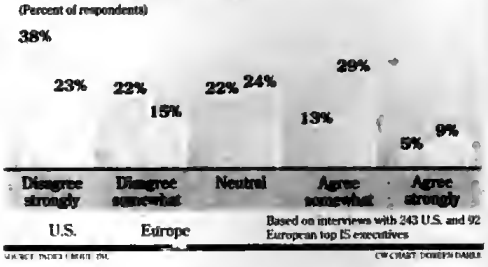
Although the bureaucratic machinery in Brussels is gaining speed, only half of the directives have been adopted by the EC's Council of Ministers. Only eight of those have been incorporated so far into the laws and regulations of all 12 member countries. EC members are sure to pass and adopt more directives in 1990, but these items are unlikely to have much direct effect immediately.

Vive la vigilance

Regardless of the EC's success, 1992 has become a symbol for growing globalization of the worldwide marketplace. Compa-

Global warming

U.S. and European IS chiefs grapple with globalization issues



Start planning for 1992 now

With 1992 a mere two years away, information systems managers will need to plan their strategies accordingly. The following is a look at what's likely to happen as market unification proceeds.

- **A bigger strategic role for IS.** As companies look for new ways to expand their presence in Europe, they will expect IS to bring a competitive edge to the business. IS will become the means for providing a local presence and local products.
- **Double-digit growth in the European information systems market.** The optimism created by talk of an integrated European market will drive firms to restructure and expand, leading to further investment in information systems.
- **Aggressive competition and pricing.** Computer and software companies moving into new territory will be hungry for market share. At the same time, large customer accounts, capitalizing on open borders and open standards, will reduce the number of suppliers with which they do business.
- **Flattening of price differentials between countries.** As goods flow more easily across borders, vendors will have to ensure homogenous pricing throughout the continent.
- **Shakeout among European computer makers.** Only the strong will survive, especially with the increased pressure from U.S. and Far East competitors.
- **More transnational alliances.** Even with borders down, companies will want to team up with local players for joint research and development, distribution and marketing.
- **Strong growth in markets for electronic data interchange and other value-added network services.** Efficient communications will be key in threading together partnerships and businesses that span borders, especially in banking and insurance.
- **Stable market share by U.S. computer makers.** Already well positioned on a pan-European scale, U.S. companies are prepared to cash in on continuing market growth despite increasing competition from European rivals.

AMIEL KORNEL

nies conducting business in Europe not only position themselves to cash in on the European market growth but also to develop invaluable first-hand experience operating in an international environment. Even businesses that choose not to do business outside of the U.S. will face foreign competition at home.

UK, French and German rivals, strengthened by growing unification of the European market, will step up their assault on North American shores. Bull H. N. Information Systems, Inc., Siemens AG, Cap Gemini Sogeti SA, Ing. C. Olivetti & Co. and other multinational companies will be joined by others in noncomputer industries.

U.S. firms will face takeover pressure and competitive environments at home, says James Senn, director of Georgia State University's Information Technology Management Center in Atlanta. "The question," Senn says, "is what do American businesses need to do to retain their competitive posture in their own markets and abroad?"

Globalization, analysts say, puts two demands on computer vendors. On the one hand, multinational clients need access to an international marketing organization that can offer one-stop shopping for products and services. Bull, IBM and Hewlett-Packard, among others, are currently creating marketing structures that allow large accounts to address their purchasing and services needs more easily through a single commercial contact.

On the other hand, a firm looking at many countries must consider the cultural specifics of each land.

The macro and micro view

"The challenge for us is to have a global vision of the market and at the same time, know how to stay local," says Yves Clerc, an analyst monitoring the EC's 1992 plan at Bull SA in Paris.

Because U.S. companies have traditionally stuck to a simplistic view of Europe as a single marketplace, they may be ahead in this game. European vendors historically have been slow to break out of their own national turf.

"1992 favors us," says Michael Spindler, president of Apple Computer Europe in Paris, "because we are known in the various markets."

"Right or wrong, companies from the U.S. and Canada always looked at Europe as a single entity. On the other hand, European firms have been too sensitive about national traits and boundaries," says Charles Chang, principal consultant at management consultancy Butler Cox & Partners Ltd. in London.

It is exactly that parochial view of the world, however, that makes Europeans argue that they are better equipped to tailor their business to local requirements.

The winners in Europe and international markets beyond, analysts say, will be those companies that best manage to balance both requirements. •

Kornel is a *Computerworld* senior editor, features.

Japan eyes workstation market

Firms from the Far East see a new chance to compete with U.S. companies

BY JAMES DALY

Think of the workstation market and a handful of companies usually come to mind: Sun Microsystems, Inc., Digital Equipment Corp. and Hewlett-Packard Co. and its Apollo division. You may, however, want to leave a few cards open in your mental Rolodex.

Japanese companies know a good thing when they spot it and are mixing a potent brew of cash and contacts to establish themselves as a crucial integer in the U.S. workstation market. Well-heeled firms from the Land of the Rising Sun not only offer established players the opportunity to gain a foothold in Asia in exchange for sophisticated technology, but they can also provide cash-hungry start-ups with financial backing (see story page 27.)

Although market research firm Dataquest, Inc. estimates that Japanese companies accounted for only 17% of the $4.3 billion worldwide workstation market last year, the figure could jump far higher by the early 1990s.

"A lot of the Japanese companies didn't do well in the PC-clone market the first time around, so they see the workstation market as offering them another shot," says David Card, an analyst at International Data Corp.

In the past, firms such as NEC Information Systems and Sony Microsystems Co. have vigorously attempted to enter the U.S. workstation market through the computer-aided design and manufacturing, software development and electronic publishing sectors. But they lacked a breadth of applications software and established distribution channels.

To compete, such firms must convince value-added resellers and distributors that the price and performance advantages of their workstations outweigh this lack of applications software. So far, it has been a tough sell. Speedy U.S. workstations sporting high-powered reduced instruction set computing (RISC) technology have outpaced the slower Japanese machines. But that is changing.

Sony has announced plans for a computer based on Mips Computer Systems, Inc.'s RISC chip set, while NEC officials have said they will manufacture the Mips chip and could base future systems on it.

Tough nut to crack

The distribution channel conundrum has provided more challenge. NEC's strategy has been to focus on individual sales through a network of personal computer retailers that has planted them in direct competition with many established PC competitors.

The U.S. arm of Sony has met frustration on U.S. soil. As a result, Sony is looking to shift its role from mainstream workstation player to niche-oriented supplier. Analysts say the company could also leverage its strength in video and high-definition television to produce workstations that incorporate various multimedia functions.

A strong challeoge could also come from Hitachi Ltd. In July, Hitachi announced that it will build workstations based on HP's RISC processor and help design a new version of the chip, which may be up to five times as fast as chips in current workstations.

The Japanese are also attempting to enter the market by investing heavily in promising start-ups. For instance, Matsushita Electric Industrial Co., Japan's leading consumer electronics manufacturer, owns 52% of Solbourne Computer, Inc., the only company producing clones based on Sun's Scalable Processor Architecture RISC design. Likewise, Japanese giant Canon, Inc. has invested $100 million in Next, Inc.

The influence of Kobota Ltd., a $5 billion agricultural equipment maker, also looms large. Although it has investments in several major U.S. firms, its most important influence may be wielded in Stardent Computer, Inc.

Kubota has a 22% stake and exclusive Far East distribution rights to one of the only graphics supercomputer makers in the world. Some analysts say these machines could revolutionize the engineering and design process.

But with these arrangements comes suspicion. Concerns are mounting in public and private sectors that the U.S. may be giving away the technological store to its biggest rival.

But supporters of these new pacts say the increasing globalization of the computer community, along with the immense financing needed for innovative start-ups leaves little choice but to turn to deep-pocketed foreign partners.

And the Japanese are willing to enter the market through whatever door is left open. "The workstation market is integral to the Japanese," Card adds. "They see workstations as the successor to the PC." •

Daly is a *Computerworld* West Coast correspondent.

Ten companies to watch in 1990

Some will fly, some will crash and some will keep circling

BY NELL MARGOLIS

Given the past year in the computer industry and in the larger world of business, it's hard to find computer companies for which 1990 will *not* be a watershed year. One way or another, the next 12 months are likely to be The Year of Living Dangerously for many companies across the computer world map. Here are our candidates for the 10 firms whose executives, employees and investors are most likely to gulp as they drink their New Year's toasts:

COMPAQ In 1990, says Richard Shaffer, president of New York-based market research firm Technologic Partners, Inc., "We'll see whether personal computers can really penetrate the minispace."

The company most likely to show us is Compaq Computer Corp. A high-flier going for a soft landing is risky, says David Wu, an analyst at S. G. Warburg & Co. But, he adds, "Compaq is extremely well-managed. I think the company can do it."

COMPUTER ASSOCIATES Computer Associates International, Inc. has been a supergrowth firm built on an aggressive acquisition strategy and powered by its own momentum.

What's going to happen to the vendor when the companies it will have to buy to beat last year's figures are beyond affordability and its momentum is called into question by dive-bombing earnings? Keep your eyes on CA, and this time next year, you'll know.

amdahl The "other" U.S. mainframe maker, Amdahl Corp., faces a race between a "declining gross margin and declining operating expenses," says Wu. "How good it looks this time next year will depend on which declines faster."

What's more, Wu says, with 1990 as the last year of the 3090 line, "IBM isn't likely to get any less aggressive on pricing." Can Amdahl technology get enough users to drop their IBM security blankets? Tune in next New Year's.

Ashton-Tate "It's difficult to destroy a company — but Ashton-Tate Corp. seems to be working at it," Shaffer says. The Torrance, Calif., microcomputer software maker's early prominent ranking in its field has held bashers pretty much at bay despite bugs and blunders that would have toppled a less eminent entry.

However, with the micro boom tailing off, life is a chancy affair for sentimental favorites such as Ashton-Tate that lack the substance to match the sentiment.

If Ashton-Tate wants to continue being mentioned in the same breath with historical rivals Microsoft Corp. and Lotus Development Corp., Shaffer says, 1990 must be The Year of No Excuses.

The timely arrival of a couple of Ashton-Tate entries that do what the company said they'd do when the company said they'd do it would go a long way toward curing the problem, analysts said.

digital "Despite all its MicroVaxes, Digital Equipment Corp. hasn't been able to escape the great softness in the minicomputer market," Wu says. Another big liability: the widely held opinion that DEC's sales force doesn't know how to sell its new products. With a series of intensive sales training programs and an ongoing parade of hot product debuts, Ken Olsen & Co. are on their mettle in 1990. "If they can't click — and I mean double-digit growth — with a product lineup like this, then they can't click," Wu says.

IBM While no one contends that 1990 will be a make-or-break year for IBM as a whole, odds are good that it will be just that in the workstation area. Shaffer notes that the IBM RT has been a favorite entry on up-and-coming lists for so long that it is beginning to seem like a has-been while still technically a wanna-be.

With Hewlett-Packard Co. positioning its Apollo division, with Sun Microsystems, Inc. under pressure to prove its staying power and with DEC coming on strong, Shaffer has a succinct message for IBM's RT forces: "Enough foreplay, already: Let's do it. Stop winking and nudging and show us your machines."

For pure attention-getting potential (not to mention venture capital attraction), few phrases in computer industry parlance match the potency of "Founder and President Steve Jobs."

That and a machine that barreled to the top of the charts in technological sex appeal put industry pioneer Jobs' second start-up, Next, Inc., firmly on the map in 1989. How much staying power the product and the company have will be measured to a great extent in 1990. Software counts — a lot, say analysts. Software writers like Next; if they like it enough to port to it, it may not be just another pretty face.

Prime. The attempted hostile takeover of Prime Computer, Inc., by a company a fraction of its size, led by a notorious corporate raider, was sufficiently colorful (and painful) to deflect attention from another interesting fact: immediately prior to l'affaire LeBow, Prime was having a harder time than it expected digesting its own hostile acquisition, Computervision. As a result, Prime visibly slowed on the road to its oft-stated goal to become a $2 billion giant.

Now, as a private holding of its chosen acquisitor and a firm reportedly slimmed to fighting trim, and under the stewardship of a new president with sterling turnaround credentials, Prime is fresh out of excuses. In 1990, according to analysts, the company will have no choice but to put up or shut up.

SUN Workstation maker Sun Microsystems, Inc., which set the industry on fire, singed its own wings last summer when a botched installation of an internal corporate mainframe wheeled in to run the company's business applications threw thousands of orders out of kilter and cost Sun its first quarterly loss as a public company. The bottom line bounced back, but the incident focused attention on a heretofore overlooked vulnerability: the lack of a mature management clout behind Sun's indisputable amount of marketing pizzazz.

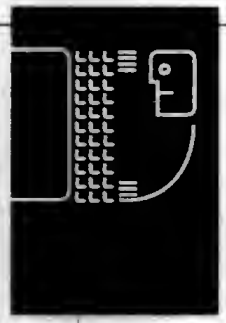
A swelling chorus of industry observers still see Sun CEO Scott McNealy as a wunderkind — but they worry that the *kind* could counteract the *wunder*. "We need to see a few gray hairs at Sun in 1990," Shaffer says.

And the sooner the better. The same competitive pressures that are being brought to bear on IBM's workstation efforts are beamed straight at Sun.

"The next year is going to be a make it or break it year for Sun," Wu notes.

WANG The good news is that Wang Laboratories, Inc. — once synonymous with technology leadership — has taken as bad a beating as a company can take and is still standing. The bad news is that Wang has taken as bad a beating as a company can take.

Industry observers agree that by the end of 1990, "Look what happened to Wang!" will be a popular exclamation. Whether the phrase is uttered with wonder or warning depends on whether the company can turn a profit by the end of its current fiscal year in June, reinspire flagging customer faith in management and support and present the market with at least one technological reason to believe that Wang has a serious place in the industry's future as well as a venerable position in its past.



Desktop sizzlers

BY JAMES DALY

An interesting mix of technological and marketing issues promises to bend and twist the personal computer and workstation worlds in 1990 like an acetylene torch on steel. The following are some highlights of what to expect:

• **The fusing of personal computers and workstations.** As vendors chase desktop dollars, once-separate PC and workstation brothers have been joined like Siamese twins, with each half stealing the other's most desirable attributes.

Workstation makers are jumping on issues such as standardization and application binary compatibility and are developing shrink-wrapped software that can compete on PC turf. PCs, in turn, have muscled up and begun to encroach on the 5 million instructions per second (MIPS) range of workstations.

Products such as Series 2500 from Hewlett-Packard Co.'s Apollo division — a Unix workstation capable of executing 4 MIPS for the fire-sale price of $3,990 — and Apple Computer, Inc.'s $6,229 high-end Apple IICI are essentially competing for the same user dollars.

Analysts predict that in several years, the differences between PCs and workstations will be tiny. The resultant "personal workstation," says International Data Corp., will boast performance rates of 10 to 20 MIPS, offer 150M- to 400M-byte magnetic disk storage and probably use

Continued on page 43

The aroma is appetizing . . .

. . . but the client/server main course is still simmering

BY PATRICIA KEEFE

ROBERT DE MICHIELL

Glasnost may be coming to a network near you. Much like the Eastern Bloc countries struggling to topple concrete and ideological barriers that block the free flow of information, so goes the battle to obtain greater access to data hidden in corporate databases. But like the new dreams of democracy, widespread adoption of the client/server computing model is likely to remain little more than an elusive vision for at least the first half of 1990 — and possibly longer.

While backers say that client/server computing can bring Fortune 1,000 organizations cheaper, more flexible systems, critics contend that it remains a promising technology in search of an application.

Client/server "is a great idea, but I can't think of any applications that will really make users jump," says Doug Gold, an analyst at International Data Corp. (IDC), a market research firm based in Framingham, Mass. "Nor am I convinced that there exists a set of business tasks that requires this architecture."

For almost two years, vendors have heralded the glorious networking era to come, which many said would begin in 1990. Central to this utopian vision is a client/server architecture, also known as distributed processing. This model works on the idea that various processing tasks are routed to the computing tier best suited to handle them.

In this approach, centralized servers handle data management and disk I/O-intensive data retrieval and processing, while screen and keyboard I/O-intensive functions are pushed down to an intelligent desktop device. Applications development is moved down to more cost-effective PCs. In essence, the client/server model is a smarter, cheaper remake of minicomputer-based servers.

The overall goal is to provide faster and easier data delivery to the end user, while protecting data integrity at the server level and easing network traffic.

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High hopes for enterprise net management

BY ELISABETH HORWITT

Shrewd money management is the name of the game at San Francisco's Charles Schwab & Co., and networking is a key part of its strategy for staying on top of that game through the 1990s.

The financial services company is defining a network architecture that will make computing resources and information accessible to users throughout the company, according to John Payne, a telecommunications analyst at Charles Schwab. At the core of that architecture will be an integrated network management system that can monitor, pinpoint and correct problems, as well as collect statistics across the company's complex, multivendor communications systems.

"We want a system that can manage everything that has to do with networking across the enterprise, from carriers to voice networks to fax machines to LANs," Payne says.

Charles Schwab is by no means alone. "Integrated network management is absolutely becoming crucial for companies right now," says David Passmore, a partner at Network Strategies, Inc., a subsidiary of Ernst and Young. As they get bigger and more complex, networks are increasingly becoming unmanageable, Passmore says. The situation forces "the poor network operator to do swivel-chair network management," switching among multiple network management terminals in order to track activity and problems across various segments of the corporate network, he explains.

A big stumbling block to enterprisewide network management is the vendor community. IBM, Digital Equipment Corp., Hewlett-Packard Co. and AT&T have all announced multivendor integrated network management platforms in the past few years. Right now, though, these vendors provide full network management functionality primarily to their own systems.

The beginning of 1990 finds the issue coming to a head for firms that are in the process of implementing corporatewide backbones that will carry their informational lifeblood — and whose reliable operation, therefore, will

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The quest for the OS/2 Holy Grail continues

BY CHARLES VON SIMSON

Operating systems are often described in religious terms by users and developers: In conversations, "faith" crops up almost as much as "conversion." Given that forecasting for operating systems such as OS/2 takes a measure of spirituality, what follows is a zeitgeist checklist for 1990:

• **A 32-bit OS/2 version will be born unto them.** The coming of a chunkier OS/2, promised for the second half of the year, will be the pace-setting event for high-end IBM Personal Computer operating systems in the early 1990s. The 32-bit version will let the system embrace Intel Corp. 80386 and 80486 high-end PC platforms.

A 32-bit environment will also permit the coexistence of DOS and OS/2 on a single machine — a boon to corporate managers looking to easily link the two worlds. The beefier OS/2 will also accommodate more sophisticated file systems and will provide a foundation for advances such as improved network management.

• **DOS vs. OS/2 angst continues.** The expected first-quarter release of Microsoft Windows 3.0 for DOS will not be the drag on OS/2 that many users and developers expect it to be; smart Fortune 500 firms such as Cigna Corp. and Bank of America have already begun standardizing on OS/2. The reason: Technical requirements of advanced corporate networks with graphical interfaces will outstrip DOS capabilities.

• **Lite OS/2 will fade from memory.** While most agree that OS/2 is the future, Microsoft and IBM will continue to offer the counterproductive promise of a 2M-byte version of OS/2 — dubbed "OS/2 Lite" — which they may not be able to deliver.

Ultimately, many analysts say they believe that the "Original OS/2" vs. the Lite OS/2 issue will be moot. The reason for this is that memory prices will continue on their steep downward slide, and users will simply wait until their high-end needs intersect with the price of memory.

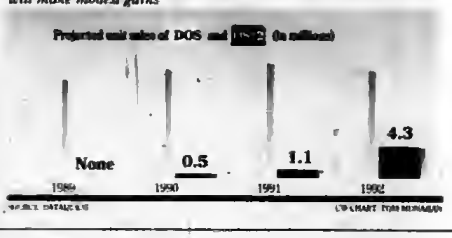
• **Windows are the eyes of the operating system.** The most fundamental shift in 1990 — and one that has already begun — will be the belief that graphical user interfaces are a necessity in corporate environments. "Expect to see windows everywhere. Microsoft's graphical user interfaces will make a strong challenge to Apple's position in the market," says Melinda Reach, Merrill Lynch & Co. vice-president and PC software analyst.

• **On the third day, developers created Unix.** The decade-old promise of a truly open platform will assume some material form in 1990. Inventive but familiar interfaces such as Open Desktop from The Santa Cruz Operation and PC Unix systems from Next, Inc. will finally banish claims that Unix is hard to use.

Cost differences between a 386-based PC with 5M bytes running OS/2 and a reasonably priced Next machine will shrink to nothing in 1990. Elegant, cost-effective design tools from these two companies will also make Unix easier to develop for low-end applications developers.

DOS remains the boss

DOS sales will not see their first dip until 1992; meanwhile, OS/2 will make modest gains



Appetizing

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However, just as Soviet Bloc countries seeking democracy are discovering the importance of a proper groundwork, so too are proponents of client/server architectures finding that a good foundation is key. Unfortunately, would-be builders in 1990 will find themselves on shaky ground for the following reasons:

• Technology issues, including a lack of standards and complex development issues — user interface, operating system or database — are hampered by incomplete tools.

• Management issues, including mainframe-oriented IS departments that lack the infrastructure to support dispersed systems and to improve outdated development and programming skills.

• The agonizingly slow pace of breaking applications into both server and client components.

• The slow migration to OS/2 on the client side and LAN Manager on the server.

• Unexpected delays in shipping front-end applications that exploit SQL Server back ends.

In addition, continued problems with network reliability provide few inducements to moving critical databases onto centralized network servers. Moreover, added security and network administration demands of client/server architecture could potentially overwhelm network administrators, many of whom are already struggling to manage "standard" multivendor networks.

Slowed by these shortcomings, implementation of the client/server model will inch forward in 1990. Once the walls blocking free information access and exchange tumble down, however, analysts predict that sales will explode. Forrester Research, Inc. in Cambridge, Mass., estimates the 1989 market for client/server computing at $2.5 billion and expects that to rocket to $14.2 billion in 1991.

Boosters say that a client/server architecture can benefit organizations in several ways. First, they contend, it will let users build a multivendor environment around just a few standards, such as SQL, LAN Manager and IBM's LU6.2.

Systems built with this new architecture will be more "supple," backers say, thanks to well-defined interfaces to users, applications and databases. The use of graphical user interfaces will also help cut training costs, reduce errors and allow tailoring for individual needs, they say. Finally, scalable hardware designs will also provide cheaper MIPS, notes consulting firm Forrester.

"The whole idea is to be able to better connect things together so that you don't have to re-enter or reinvent information," explains David Cearley, a senior research analyst at Gartner Group, Inc. in Stamford, Conn.

Internetwork client/server systems typically include client stations, a local-area network wiring system, network servers, network operating system software, an internetwork facility, gateways that tie these internetworked systems to mini and mainframe hosts and network management facilities that harness and control the internetworked system.

Users will no longer have to decide whether to anchor an application on a PC, minicomputer or mainframe, the logic goes. Instead, IS groups can concentrate on the application, since it will run across scalable tiers.

The approach has already excited big-name users like the Bank of America in San Francisco. Robert Berger, vice-president of administration at Home Express, Inc. in Hayward, Calif., says that client/server can help simplify "what-if" scenarios by speeding up data retrieval. "You just can't believe the savings in time," he says.

Home Express is testing pilot projects. Trina Grossman, manager of computer operations, says the company will begin refitting about 20% of its major systems with client/servers in 1990.

Other users, such as Citicorp Mortgage in St. Louis, also cite cheaper applications development costs, better use of workstation MIPS and a common, systemwide graphical user interface.

The oft-mentioned lack of applications is a serious roadblock to wider acceptance, however.

In January 1989, vendors acknowledged the need for more products, promising major rollouts in 1989. This hasn't happened, however, largely because client/server computing got hung up by the slow growth of

Until client/server architecture comes ...

While vendors and developers struggle to provide the base of a client/server architecture, firms can begin to map out migration strategies.

Analysts urge users to apply a little Soviet-style "perestroika" to their organizations and network infrastructures. According to Forrester Research, Inc., a market research firm in Cambridge, Mass., organizations have the following migration paths open to them:

• **Upgrade current personal computer or workstation-based local-area networks.** Advantages include savings related to the installed base of these systems, the LAN focus of most software developers and the ability to maintain user independence. The disadvantage is that the onus and work falls mostly on the user, who must cope with limitations of earlier micro generations and limited system management skills among users.

• **Revamp older time-sharing systems oriented toward centralized data.** IS is most comfortable in this environment, which Forrester says provides the fastest route to pushing an existing program out to users, who in turn gain easy access to host-based mission-critical applications. However, this approach can be costly as older Cobol applications may prove too messy to convert and host developers may need retraining to develop C-based graphical interfaces.

• **Build new systems.** This approach lets you wait for standards to settle and then build from the ground up. Drawbacks include forcing users to wait for relief as well as the possibility of missing business opportunities.

Those decisions should be based on three criteria, according to Forrester: the user's investment in existing applications, the approach to distribution of files and the need for flexibility.

David Cearley, a senior analyst at Stamford, Conn.-based Gartner Group, Inc., urges users to purchase or develop modular applications that take advantage of a multitiered server-based system.

"From the application development [standpoint], we recommend that users look at the entire network as one entity, developing applications in a modular fashion so that pieces are spread out over the workstation and various server tiers," he says.

For example, users can take advantage of front-end development tools, such as Interactive Images' Easel, to use the power of PCs to develop better user interfaces and extend the capabilities of mainframe applications down to the desktop.

Terminal users linked to hosts should swap in intelligent PCs, Cearley adds.

PATRICIA KEEFE

OS/2 and applications, which seriously retarded user incentive to move over to OS/2.

The industry "made several serious miscalculations," admits Robert Metcalfe, founder of 3Com Corp., a key client/server booster.

Complaints about a lack of good compelling applications could be blunted by the early December release of Lotus Development Corp.'s Notes, a workgroup information manager and productivity tool. Four years in the making, Notes features support for the two reigning graphical user interfaces — Microsoft Corp.'s Windows and OS/2 Presentation Manager. Beta-test site Price Waterhouse was so taken with the package that it immediately snapped up 10,000 copies of the so far "unproven" product, according to Sheldon J. Laube, national director of information and technology.

Meanwhile, organizations can expect to develop their own front-end applications. This will mean retraining programmers and paying more attention to security and administration, warns John McCarthy, director of research at Forrester Research, Inc. in Cambridge, Mass.

Another big stumbling block for developers is standards — or lack thereof. "The problem is developers have to learn a whole new environment," says Bruce Robertson, director of consulting at Interconnect, a Los Angeles-based network integrator.

The industry has settled on SQL as the database server, and last month, IBM and Microsoft announced position statements (but not time tables) in support of DOS-based Windows and OS/2 Presentation Manager.

But IBM promptly complicated matters again in December, by announcing four separate client/server architectures.

Developers face another technical brick in the wall: how to achieve transparent, distributed processing in heterogeneous environments. Many of today's interprocess communications protocols are network- or operating system-dependent and are incompatible.

Currently missing is a critical link: standardized remote procedure calls (RPCs). RPCs generate the communications code needed to distribute applications and automate the processing of migrating applications from one network to another. The Open Software Foundation is currently trying to choose between several competing RPC standards and says it will make a final selection in March or April.

Despite obstacles, the outlook is not all bleak for organizations interested in client/server computing. During the last six months in particular, the distributed concept has increasingly been translated into real products that lay some of the necessary groundwork.

Notable are the deliveries of long-promised OS/2 versions of popular applications — tangible evidence that IBM and Microsoft have coordinated their OS/2 LAN server products. Vendors of database management systems have begun shipping long-awaited SQL servers and back-end components, as well as a new class of file server said to rival minicomputer price/performance. Included in this latter group are products from Compaq Computer Corp., Netframe Systems, Inc. and Auspex Systems, Inc. Development tools have also begun to ship, and a handful of software vendors, such as Saros Corp. (Fileshare) and Aldus Corp. (Pagemaker), have delivered applications exploiting distributed processing.

So, while 1990 will probably not be the "Year of the Client/Server Architecture," it should be the year that client/server computing knocks many more bricks out of the data center wall. •

Keefe is *Computerworld's* senior editor, PCs and workstations.

Sizing up client/server

What are the pros and cons of a client/server architecture? According to Digital Consulting, Inc. in Andover, Mass., it offers the following plusses:

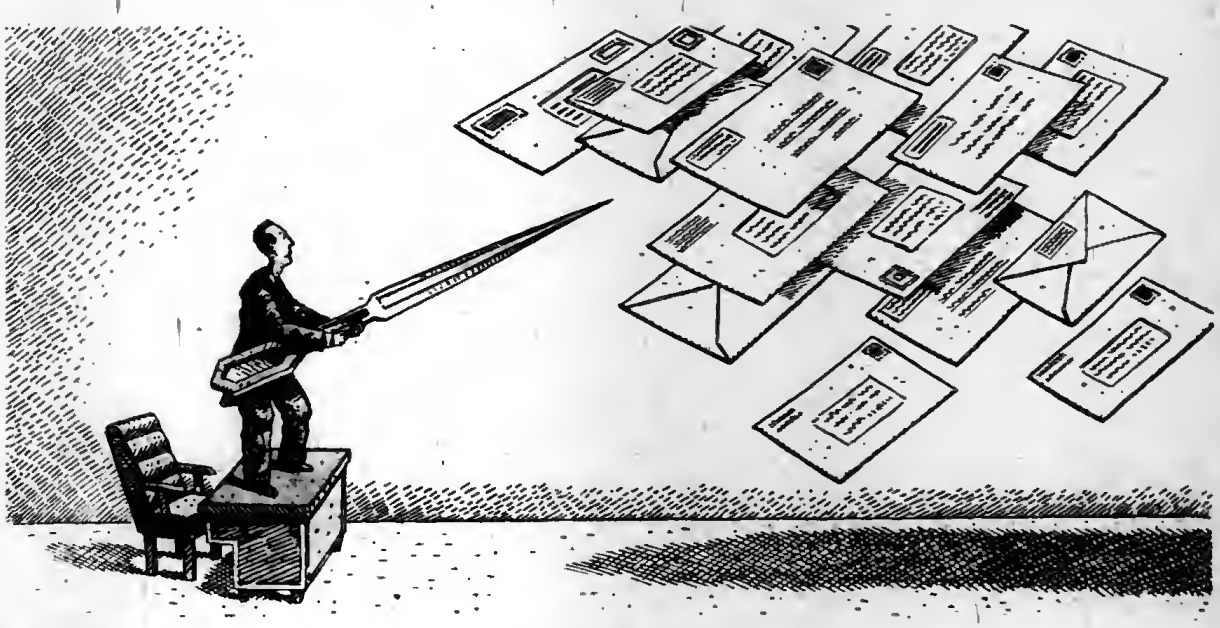
- Flexibility, because data is isolated from applications.
- Better access to data in mainframes, LANs and PCs.
- Standard graphical user interface.
- Scalability.
- Standardized, multivendor environment.

Among its minuses, client/server has the following:

- Requires a database administrator and mini.
- Lacks off-the-shelf applications.
- Has unclear distribution, sales and support channels.

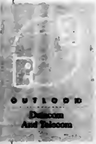
Serve 'em up

A key part of distributed computing, server sales will reach $11.7 billion by 1994



Coming down the networking pipeline

BY JOANIE WEXLER



A wealth of low-cost services will create a kid-in-a-candy-shop environment for buyers in 1990. Factors to watch include the following:

• **A transmission capacity glut.** Because of the current surplus of transmission capacity in the U.S. — from "overbuilt networks to satellites decaying in orbit," according to one industry analyst — users in metropolitan areas will have a wealth of options for communicating with other metropolitan areas. Industry observers say that because of this abundance, carriers will probably try to grow by enhancing services or lowering costs — good news for users either way.

• **More Integrated Services Digital Network (ISDN) offerings.** In the first quarter of 1990, U.S. Sprint Communications Co. in Kansas City, Mo., and MCI Communications Corp. in Washington, D.C., are expected to introduce ISDN Primary Rate Interface (PRI) capabilities similar to those offered by AT&T since 1988. PRI offers switched 1.544M bit/sec. service through the public network for integrated voice and data.

The firms join AT&T, which continues as the ISDN pacesetter. The Basking Ridge, N.J.-based carrier announced in November that it intends to introduce ISDN service in 180 additional locations in 1990, bringing the total number of locations served by the carrier's PRI offering to 290 by year's end.

• **Growth in fractional T1 services.** This year should see big growth in the popularity of fractional T1, which grants T1 economies to users lacking heavy enough transmission requirements to justify the cost of a full T1 pipe. The fractional approach lets users purchase 64K bit/sec. increments of the 1.544M bit/sec. T1 bandwidth. Analysts say that fractional T1 services for point-to-point integrated voice and data should be widely available by the end of next year.

AT&T, which has offered fractional T1 since last June, plans to expand its offerings from 100 locations at year-end 1989 to 175 locations by June 1990, according to an AT&T spokeswoman. U.S. Sprint and MCI announced nationwide availability of fractional T1 in September, and the former Bell operating companies are expected to follow suit.

Consultants say that fractional T1 probably will replace the need for 56K bit/sec. digital data service (DDS). The reason is that fractional T1 typically provides 256K to 384K bit/sec. for the same price as a DDS line.

• **Use of special tariffs.** Special tariffs and the proliferation of bulk purchasing agreements will also help trim telecommunications costs in 1990.

Tariff 16, for example, which was recently offered by AT&T and earlier by Sprint, allows interstate communications between campuses or between government offices at prices similar to those of a virtual private network. "The volume discounts put your interstate calling costs as low as 6.4 cents a minute for a 5,000-mile call," notes Patrick Springer, director of industry services consulting at Telecommunications Management Corp. in Needham Heights, Mass.

• **Better network management.** 1990 could see substantial growth in switched networks — and the abandonment of many private networks. Some observers see the growth as part of a trend back to carrier-managed networks.

Springer predicts a rebirth in the Centrex voice-switching service, an expected fruit of an IBM-Northern Telecom joint venture. He says the two plan to merge large commercial IBM mainframes and Northern Telecom's SL-100 and DMS-100 central office switches. The goal is to beef up the network management capabilities of local carriers.

The payoff to organizations, according to Springer, is that "if carriers could provide that information to a user for multisite Centrexes, the user wouldn't need to take up space on the premises for a PBX and employ skilled personnel to manage the network."

High hopes

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be necessary for competitive survival.

Charles Schwab, for instance, is currently evaluating all of the major integrated management platforms and hopes to pick one by the end of the second quarter of 1990, Payne says.

"Our big frustration is that no one provides effective remote management of local-area networks," he says.

His company expects to implement approximately 300 remote LANs within 24 months and wants to "at least have a plan for IS management of those LANs up front," Payne says.

Dozens of companies signed multimillion-dollar, multiyear contracts last year with network services and equipment providers — the first step toward consolidating disparate point-to-point links, subnetworks and "sneakernets" into a coordinated, enterprisewide network.

"All U.S.-based companies are driven by productivity, and they don't want their network to stand in the way when it comes to delivering utilities, tools and capabilities to make employees competitive in the corporate marketplace," says Stanley Welland, manager of telecommunications at General Electric Co.

"We're still chasing the dream of one management system," says Ken Minet, a senior analyst at Chevron Information Technology Co. "We have a lot of technical stuff at remote ends and need to bring it into centralized management."

Impatiently waiting

The above companies are just a few of the growing throng that is watching and waiting with impatience as AT&T, IBM, DEC and HP gradually add substance to their integrated network management systems.

Delays by vendors delivering multivendor integrated management products, Passmore explains, are due to lack of standards. All major vendors have promised to support the Open Systems Interconnect (OSI) network management standards, but not until the end of 1990 at the earliest. The popular excuse is that OSI standards are not yet firmed up.

Still, OSI seems to be the long-term solution: OSI-based network management systems will dominate the market in 1995 with $525 million in sales, compared with $150 million for proprietary systems, according to a recent report by Probe Research, Inc., a Cedar Knolls, N.J., research firm.

Now, however, the industry barely exists. Sales for OSI-based network management systems were $2 million last year, compared with $35 million for proprietary systems, according to Probe.

Certain vendors are currently addressing the multivendor problem by offering specifications for interfacing other vendors' products with their own systems. The problem is that such interfaces tend to be limited at best.

IBM's Netview/PC, for example, has earned a reputation for being an expensive and cumbersome way to link non-Systems Network Architecture devices to Netview. AT&T has so far provided specifications for a limited, one-way connection to its Accumaster Integrator. DEC has yet to provide any multivendor interfaces, although the company has promised to support a variety of protocols by year's end.

Companies that have grown tired of waiting for vendors to deliver the off-the-shelf, standards-based network management system of their dreams are finding ways to get what they need now, mostly via several

ANDREW SHACHAT

emerging segments of the network management industry.

What follows is a rundown of currently available options:

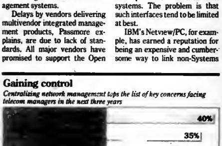
• **TCP/IP.** Rather than wait for the OSI millenium to arrive, some organizations — particularly in the government sector — are content to use Transmission Control Protocol/Internet Protocol (TCP/IP) as a multivendor networking — and therefore network management — standard. The Simple Network Management Protocol (SNMP) "is here now and it works" as a management protocol for TCP/IP networks, according to Passmore. It is being adopted by an increasing number of vendors, particularly "the people that tie LANs and WANs together," but not by the major integrated management plaform vendors that are waiting for OSI.

"DEC is ignoring TCP/IP; IBM has said it will support [SNMP] but not how or when," Passmore explains.

• **Homemade solutions.** Some corporations have decided to use their own internal IS resources to develop their own integrated network management systems. However, rather than develop everything from scratch, these firms often enhance and extend existing platforms, many times with the help of an emerging breed of network manage-

Gaining control

Centralizing network management tops the list of key concerns facing telecom managers in the next three years



Base of 165 telecom managers

SOURCE: NEWTON-EVANS RESEARCH CO. CW CHART: DOREEN DAHLE

ment entrepreneur.

Vendors such as TSB International, Inc., Telwatch, Inc. and Objective Systems Integrators provide management features such as expert systems-based troubleshooting, as well as tools for connecting existing platforms to whatever equipment a user happens to have installed.

• **Network management integrators.** The drawback of the above offerings is that many are tools and not "drop-it-and-leave packages," says Jeremy Frank, a vice-president at Gartner Group, Inc., a consulting firm in Stamford, Conn. Niche firms offer some support, but they still must work closely with the customer to implement their management capabilities into the overall system.

Sensing an emerging market, network management systems integrators have popped up like mushrooms. Each is offering to help customers define needs, then put together the right products and code.

Among the vendors converging on this area are systems integrators such as Electronic Dats Systems Corp.; independent network consulting companies such as Network Management, Inc.; Big Eight accounting companies such as Ernst and Young subsidiary Network Strategies, Inc.; and the major vendors such as IBM, DEC and HP, all of which have network integration subsidiaries.

• **Outsourcing companies.** Perhaps the most controversial of the network management alternatives users are considering is the idea of letting their computer vendor or network vendor or systems integrator — or a combination — take over management of the entire network operation (see story page 8).

Ironically, two of the early companies to take this plunge are not small organizations with few information systems resources but rather Fortune 500 companies at the forefront of technical innovation. Merrill Lynch & Co. has opted to let IBM and MCI Communications Corp. manage its gigantic network, with some cooperation from its own internal network management organization. And Eastman Kodak Co. has reportedly chosen DEC to manage its own corporatewide network.

To balance the risks, pioneering users are likely to get attractive packages from vendors that are anxious to get a few major customers under their belts as soon as possible. •

Horwitt is a *Computerworld* senior editor, networking.

Small firms fill void left by network management vendors

The law of supply and demand has finally begun to make itself felt in the integrated network management industry.

With the major network-management system vendors' platforms stymied because of a lack of standards, smaller, entrepreneurial firms have come into the limelight with tools for tailoring a network-management system to a company's unique mix of products and communications needs.

These offerings have users curious. "Some of the independent approaches are of real interest to us," says Ken Minet, a senior analyst at Chevron Information Technology Co.

What follows is a sampling of the activity in this burgeoning market segment:

• **Carl Vanderbeek and Associates,** one of seven small vendors named by IBM as a business partner last November. Like the others, Vanderbeek's products can extend IBM's Netview functionality for multivendor support.

The firm has developed what is said to be a two-way gateway, which, in conjunction with Netview/PC, links non-IBM Systems Network Architecture equipment to Netview.

• **TSB International, Inc.,** another niche player, provides a similar link between Netview and a variety of private branch exchange systems and will be doing the same thing for DEC's Enterprise Management Architecture.

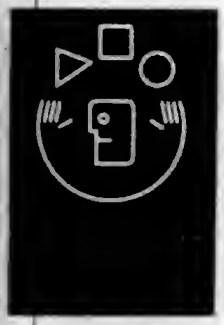
• **Network Management Services Group, Inc.** in New York, originally a group of Citicorp telecommunications managers, has developed software to generate usage, error and accounting reports on Telenet Communications Corp. packet switches. The firm has since extended this capability to other types and brands of equipment. Among Network Management's customers are K Mart Corp., Pacific Gas and Electric and Chevron Corp. — not to mention Telenet, which resells the system under its own name.

• **Telwatch, Inc.,** one of several small companies said to be helping American Express Co. in its struggles to develop an intelligent, multivendor management platform based loosely on Netview.

Telwatch connects various telecom devices to Netview. One firm involved is a Telwatch offshoot, Objective Systems Integrators, whose Netexpert system gathers and correlates alerts from a variety of devices. Nynex Information Solutions Group, Inc. is reportedly using Netexpert as a key piece of its network management platform.

ELISABETH HORWITT

For vendors, it's time to deliver on promises



BY ROBERT MORAN

Besides marking the beginning of the decade, 1990 is the due date for many promised applications development products from IBM and other firms.

Even as products arrive, however, information systems will continue to struggle with decisions about the value of computer-aided software engineering (CASE) and on what platform to develop applications.

Another trend in 1990 will be the beginnings of application integration — a move away from today's stand-alone applications and into the domain of distributed database technology.

Key developments of the coming year include the following:

• **A flood of product.** In 1990, an influx of new technologies is expected to provide users with a framework to improve productivity and manageability of their applications development life cycle. The list of products includes IBM's Repository Manager/MVS Version 1 (June); IBM's Cross Systems Product (CSP)/Application Execution (June); IBM' CSP/Application Development (June); IBM's CSP/370 Runtime Services (limited shipments start in June); IBM's Developmate Version 1, Release 1 (December); IBM's Software Analysis Test Tool (March); IBM's Workstation Interactive Test Tool (June); Bachman Information Systems, Inc.'s Bachman/Re-engineering Product Set for OS/2 Extended (fourth quarter); Index Technology Corp.'s Excelerator Series for OS/2 Extended (second quarter); and Knowledgeware, Inc.'s application Development Workbench for OS/2 Extended (first quarter).

• **The arrival of AD/Cycle.** In 1990, organizations will get their first taste of IBM's AD/Cycle software. That concept, which IBM announced and touted last June as its applications development strategy for Systems Application Architecture (SAA) environments, will begin providing the framework for users to improve productivity and manageability of their applications development life cycle.

Although users can take a first cut at the life cycle with an investment of about $20,000, observers say that a full-blown version of AD/Cycle will cost about $2 million.

Cost considerations notwithstanding, the June delivery of the repository and the information model — which will ensure consistency between the repository and associated life-cycle tools that will be delivered throughout the year — may breed more questions than answers.

"CASE tools won't be able to tie into the repository until late 1990 or early 1991," says Jerry Grouchow, vice-president at American Management Systems, Inc. According to Grouchow, by the end of the year, vendors will still not have had time to make the information models of their tools consistent with IBM's.

• **Growth of PC-based development.** Analysts expect organizations to push applications development off the mainframe, prompting questions of whether to develop them on PCs or database servers.

IBM's strategy for distributing SQL among its SAA platforms will not be completed, at the earliest, until 1993, leaving room for interim solutions and huge questions about trade-offs.

• **Interest in third-party DBMS products.** Organizations will turn to the third-party DBMS market, observers say, selecting among SQL implementations from front-end tools such as Borland International's Paradox and Dataease International, Inc.'s Datatease and from back-end tools or servers such as IBM's OS/2 Extended Edition; SQL Server, the joint effort of Ashton-Tate Corp., Microsoft Corp, and Sybase, Inc.; and Oracle Corp.'s Oracle and Gupta Technologies, Inc.'s SQLbase. All will be vying for Ashton-Tate's Dbase market dominance.

• **DB2 and OS/2 connectivity.** In 1990, DB2 will still communicate only with DB2, and SQL/DS with SQL/DS — a scenario still significantly shy of IBM's strategy for heterogeneous communications among its SAA databases, which include DB2, SQL/DS, OS/400 and OS/2.

Observers anticipate that in 1990, IBM will announce connectivity between DB2 and OS/2. In addition, others anticipate that IBM will announce the ability to automatically update a DB2 database when updating its IMS.

• **Movement by Computer Associates.** Computer Associates International, Inc. in Garden City, N.Y., will continue to deliver components to its Application Construction Environment (ACE), an architecture based on the integration of PC and mainframe tools for the development of applications with relational database management systems.

The big challenge: Putting the pieces together

OUTLOOK: Manufacturing And Design

BY ELLIS BOOKER

In 1990, manufacturing information systems will begin to incorporate relational distributed architectures that will link corporate and shop floor systems. The following are other key developments to watch for in the manufacturing arena:

• **Integration of design and the shop floor.** In 1990, there will be efforts to better integrate computer-aided design and manufacturing (CAD/CAM) systems with corporate-level manufacturing resource planning (MRP) and factory-level control systems.

• **Conflicts between proprietary systems and standards.** The battle between proprietary operating systems and networks and open approaches will continue in 1990. Unfortunately, industry watchers say that it's too early to tell whether open systems will win. Productivity and quality issues are paramount at the moment, overshadowing debates over "open" vs. "closed."

• **Continued growth of EDI.** The use of EDI between suppliers, manufacturers and customers will continue the momentum of the last 18 months. A recent survey of 1,504 corporations with sales of over $50 million conducted by EDI Research, Inc. in Oak Park, Ill., found that 17% of the respondents currently use EDI while another 11.1% plan to implement it within two years.

• **Emphasis on CIM strategy, not products.** Consultants making the computer-integrated manufacturing (CIM) lecture circuit this season are urgently telling their clients not to wait for an off-the-shelf panacea. Their strongest advice is about strategy, not technology. Manufacturers, they say, must scrutinize production processes and products, simplify them, and then — and only then — automate.

• **Rise of industry-specific protocols.** To date, the lack of standards has impeded strong integration among the three functional areas of IS manufacturing: corporate-level material handling and accounting systems, CAD/CAM systems and factory-floor control and monitoring systems. Into this breach may come industry-specific protocols. In the summer of 1989, for example, five Fortune 100 food and pharmaceutical firms began development along with IBM and others on the Process Operations Management System, an IBM OS/2 Extended Edition-based data management architecture — a taste of things to come.

• **Test of IBM's CIM strategy.** In late October, IBM unveiled its CIM strategy and some 50 hardware and software products, collectively called IBM CIM Architecture. Based on Systems Application Architecture, the approach uses the AD/Cycle software development scheme and a common data repository called the CIM Communications and Data Facility. But will it fly?

• **Emergence of intelligent systems.** According to Yankee Group, the goal of automation is to evolve into the use of systems that can help plants make the best use of all resources.

The Boston-based research company forecasts that the U.S. process control market — including hardware, applications, software integration and maintenance services and networking equipment — will grow from $3.17 billion in 1988 to $6.42 billion in 1993. In the '90s, intelligent, rule-based process control systems will supplant the current generation of dumb terminals and data collection, Yankee Group says.

• **Fill-in-the-holes partnerships.** Richard Berry, president of CIM Strategies, Inc. in Mount Clements, Mich., says that technology partnerships or outright acquisitions will be the rule in the early part of 1990.

MINI POLL

Predictions for PCs

"First, the biggest contribution in terms of making [PCs] easier to use and really accessible to more people is the graphical user interface.

"The second thing that will be important is this notion of people being able to work with multiple applications, which in most cases will come from different vendors, and having those applications integrate seamlessly."

Steven A. Ballmer, *vice-president of systems software, Microsoft Corp., Redmond, Wash.*

"We believe that there will be at least four cultures that will exist at the desktop [in the '90s]: those who use DOS, those who use OS/2, those who use Unix and those who use the Macintosh operating system. I think they all have to be merged and made to look as though they are one system and they will be."

Raymond J. Noorda, *president and CEO, Novell, Inc., Provo, Utah.*

"An infrastructure is being built that will enable applications for more group processes. This client/server architecture, which goes with the LAN implementation, is a very important one within this trend. The trick here is to try and differentiate between what is a trend and what is a trendlet."

Fernand B. Sarret, *general business manager, new business opportunities, IBM's desktop software division, Armonk, N.Y.*

"You'll see a significant improvement in the price/performance. PCs will not be personal computers anymore in many cases. Building on that [PC] investment is going to be critical in the 90s."

Michael S. Swavely, *president of Compaq Computer Corp., Houston, Texas.*

CHRISTOPHER LINDQUIST

Hardware makers follow IBM lead

BY ROSEMARY HAMILTON

IBM will force its large and medium systems rivals to play catch-up in the coming year. On the large-scale front, information systems organizations can look for the following in 1990:

• **A possible Summit rollout.** Still under wraps at IBM is the long-awaited 3090 follow-on named Summit. Some say the rollout date will be late 1991 or early 1992; more optimistic industry watchers say the machine will debut at the end of 1990.

In the first case, analysts expect IBM to announce a 3090 "kicker" by year's end that will fill in the gap between the 3090 J — the mainframe series it introduced in late 1989 — and Summit. In the second scenario, IBM will waste no time in releasing Summit, because the 3090 is at the end of the line and the firm needs the mainframe revenue on the books for 1991.

Right now, analysts expect the appearance of an enhanced 3090 in 1990. "Next year will be stage-setting for Summit," says Jeffry Beeler, an analyst at Dataquest, Inc. in San Jose, Calif. "It's the last hurrah for the 3090 and its [plug-compatible] equivalents."

• **Amhdahl and Hitachi will play tit for tat.** Expect 3390 responses this year from Amdahl Corp. and Hitachi Data Systems, Inc.

On the CPU front, Hitachi is expected to come out with a high-end mainframe early in the year that industry watchers expect will beat the performance of IBM's J series. "We expect a 50-MIPS uniprocessor from Hitachi," says Frank Gens, an analyst at Framingham, Mass.-based IDC Financial Services.

Amdahl closed 1989 will another addition to its 5990 line. Observers expect it to respond to the J series with continued tweaks to the 5990 line.

• **Mini makers move on the mainframe market.** The action in the non-IBM mainframe market will come from an unlikely source — minicomputer makers. Digital Equipment Corp. and Tandem Computers, Inc., for instance, plan to ship mainframe-class systems this year after splashy debuts made last year.

• **Debut of the IBM 4391.** Next year should also bring the the long-awaited 4381 follow-on and a new component to the large-systems storage architecture that would greatly improve data transfer rates.

Many believe that IBM will release a high-performance 4381 — dubbed the 4391 — with performance in the eight million instructions per second (MIPS) range in early 1990, with a mid-1990 ship date.

• **New storage architecture.** Analysts expect IBM to change the protocols that govern data travels to make them more efficient.

IDC's Gens says the new approach would bring a major change to allow IBM's high-end controller, the 3390, to swap data with the CPU at rates of up to 9M bytes per channel, instead of the current 4.5M-byte limit. Gens also expects the addition of fiber optics, which would also help increase data transfer rates.

• **Shipments of the J series and 3390 drive.** The next several months will be critical for IBM as it begins volume shipments of its newest mainframe, the J series, and its much-talked-about high-end disk drive, the 3390. Both items were introduced in late 1989.

Not only do the two products represent billions in revenue, but they'll do one of two things for IBM: They'll either right the wrongs of 1989 or create a serious credibility problem for the company.

• **Unisys and Bull show their stuff.** Unisys Corp. and Bull H. N. Information Systems, Inc. began deliveries of new top-of-the-line mainframes in 1989, the 2200 series and DPS 9000, respectively. Many observers believe that both firms will continue pushing these boxes through 1990. "Don't expect anything radically new from the other guys, because the dynamic in the market has been a consolidation to the [IBM] System/370," says Donald Bellomy, International Data Corp.'s director of processor research.

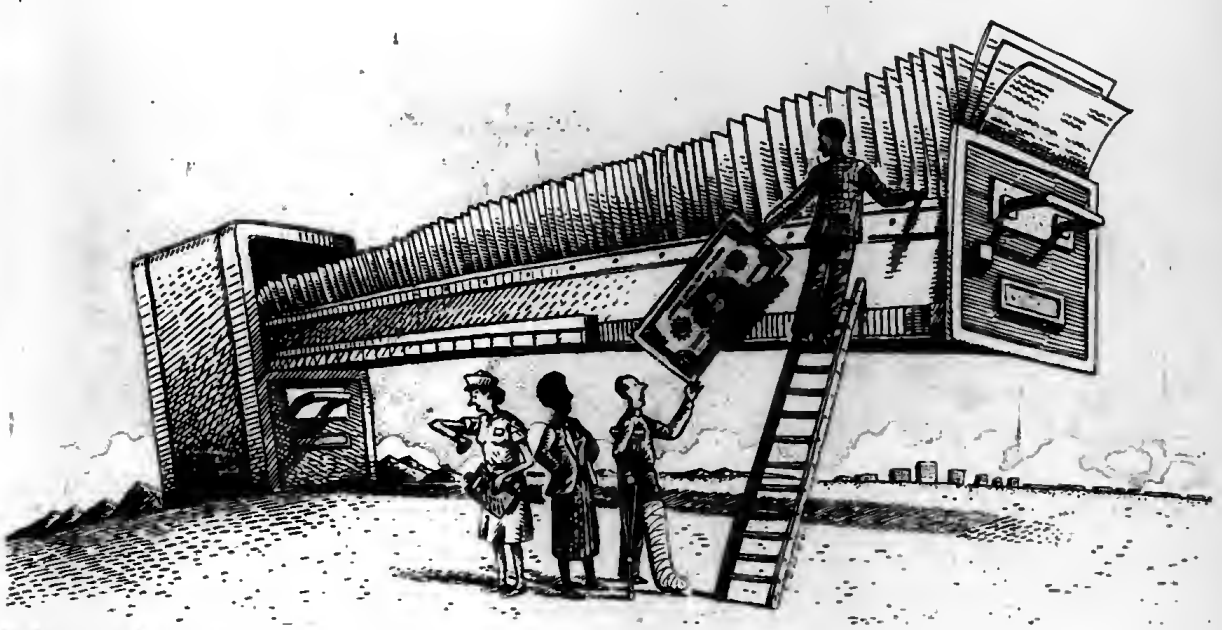
As for the mid-range sector, IS should keep an eye on the following trends:

• **A continued switch from proprietary systems.** Minicomputer makers have found that reliance on proprietary product lines is a dead end. Many have taken the only choice — plunging into open systems territory. It is still unclear if this highly competitive and price-sensitive market will be their salvation.

Bellomy says the next year will be a continuation of the difficult transition mini vendors began in 1989: "We don't see any escape from the vise these guys have been in this year. I think they have to bleed a bit more."

• **Rollout of the IBM's RT.** IBM's new RT, nicknamed Rios, could debut as early as January. IBM is basing the Rios on a proprietary reduced instruction set computing chip and its own Unix implementation.

• **Facelift for the IBM AS/400.** IBM's proprietary mid-range offering, the Application System/400, will get at least two new models and big price cuts at the low end in the first half of 1990, according to Dave Andrews, president of ADM, Inc., an AS/400 consulting firm in Cheshire, Conn.



"This system just can't process claims fast enough. And that makes for a lot of dissatisfied customers."

See me, hear me, move me: The coming of age of multimedia

Researchers at the Sarnoff Center use HDTV and computers to picture tomorrow

BY MICHAEL ALEXANDER

The year 1990 marks the start of a decade that will be one in which sights, sounds and multimedia applications on desktop computers will take off in a big way. "The future of computing lies in our ability to visualize data because it's our most important sense," says Curtis Carlson, director of the information systems research laboratory at the David Sarnoff Research Center in Princeton, N.J.

"The merging of high-definition video and computer workstation technologies will profoundly change the way people use computers by interacting with video," Carlson says.

Scientists at Sarnoff, Bell Laboratories and other top research centers across the country are racing to develop computer applications that include video, data and voice. These applications promise to make computers easier to use, and the research that goes into developing these applications can also be applied in countless other ways in such applications as home entertainment, education and medicine, among many other areas.

Sarnoff, Sun Microsystems, Inc. and Texas Instruments, Inc. were recently selected by the Defense Advanced Research Projects Agency (DARPA) to develop a multimedia video workstation for displaying video, still images, computer graphics and text in windows on a high-resolution screen. TI will provide the semiconductor talent that is needed for the project.

As part of a program aimed at advancing systems that make use of high-resolution displays, the U.S. Department of Defense's DARPA is currently funding the development of display processors that will ultimately be used in high-definition television (HDTV) broadcasts and other systems. Display processors are needed to transform high data-rate signals sent by microwave radio, satellite, fiber optics and other transmission systems into a form that can be used to drive a high-definition display.

DARPA also has awarded contracts to Sarnoff to build a supercomputer for the agency that will enable HDTV engineers and scientists to work on high-resolution video applications in real time, reducing development work from weeks to hours.

In the view of many tied to the computer industry, development work on HDTV will spin off a variety of technologies with applications in everything from multimedia applications to supercomputers.

"HDTV will have a pervasive reach because images are our most important way of looking at information. Because [HDTV] requires massive amounts of processing power and memory, it will dominate everything in computing," Carlson says.

HDTV has already been launched in Japan, and a broadcast system is nearing completion in Europe. But concern that the Japanese will dominate the HDTV market here just as they control most areas of consumer electronics has some industry leaders worried. To cede HDTV to the Japanese, they argue, means giving up in personal computers, custom chip development and other vital areas.

Funding for HDTV

The American Electronics Association has proposed funding of approximately $1.5 billion to establish a company to pursue HDTV development work. Others are asking for a relaxation in antitrust laws that would enable corporations to set up joint ventures in research and development and manufacturing. Some members of Congress are also concerned. A bill now in the Senate proposes reinstating tax credits to provide greater incentives to corporations willing to cooperate on developing HDTV and related technologies.

ANDY FREEBERG

Carlson: *"The future of computing lies in our ability to visualize data"*

Government support for HDTV projects are in jeopardy, however. The Bush administration is proposing to trim funding for DARPA, which provides $35 million per year for HDTV research, and to cut back support sharply for Sematech, a consortium of semiconductor companies that believes that HDTV will spur development of custom chip manufacturing technology.

While television broadcasts using HDTV technology are still several years away, work on high-resolution displays will have an almost immediate impact on desktop teleconferencing, electronic video mail, medical imaging, computer vision, broadcasting and consumer electronics, according to the experts.

Multimedia applications — the mixing of video, compact-disc-quality sound and software on desktop computers — will also take off soon, thanks to heightened awareness of HDTV, researchers claim.

Even though there is little agreement about what multimedia is beyond the mixing of video, sound and software, researchers predict that the potential market is huge. Desktop Presentations, Inc., a market research firm in Mountain View, Calif., forecasts $11.4 billion in worldwide sales of multimedia-related hardware and software by 1993, up from $440 million last year.

Multimedia will gain added currency this year with the debut of Digital Video Interactive (DVI) add-in cards for IBM's Personal System/2 series of PCs from Intel Corp. and IBM. The technology, developed at Sarnoff and acquired by Intel, involves compressing up to an hour of video as well as audio, graphics and text onto a compact disc/read-only memory (CD-ROM) optical disc and decompressing video images in playback. In addition to IBM, Intel also has won the backing of Microsoft Corp. for the technology.

Already, there are more than 20 companies as diverse as Du Pont Co. and Ogilvy & Mather Worldwide working on DVI applications on CD-ROMs, nearly all of which are for employee education and training.

Market researchers at Diversified Data Resources, Inc., a newsletter publisher, predicts that the CD-ROM market will grow 27% by 1990 to $187.7 million.

Apple Computer, Inc., an early leader in the multimedia race, says it will introduce a new Macintosh, perhaps in 1990, with a built-in digital signal processing (DSP) chip

Alexander is a *Computerworld* senior editor, advanced technology.

that will enable the machine to be used with high-end video editing and sound production equipment.

DSP will also allow the Macintosh to compress video, animation, graphics, text and sound for playback in multimedia applications, transmission over networks and storage.

If DVI and other forms of video technology for desktop systems make as big a splash as predicted, those technologies will hasten demand not only for high-resolution displays but also for optical storage devices, processors, networks and buses.

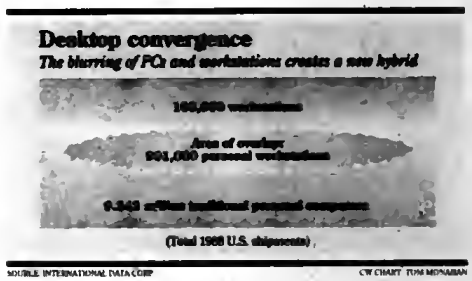
Audiovisual electronic mail and groupware applications, which make extensive use of display technology, are also expected to pick up speed. Researchers at Bell Laboratories are working on a videoconferencing management system called Rapport that enables a group of users to interact via workstations.

The researchers hope to simulate the ordinary, work-related activities of workers through "electronic hallways" and "virtual meeting rooms." High-definition displays are critical to these sorts of applications because researchers aim to include video images of users that can be popped up in windows on-screen during sessions. •

Sizzle

CONTINUED FROM PAGE 35

OS/2 or a virtual memory Unix operating system with a standard windowing environment.



• **The advent of 1486 machines.** Watch out for more rollouts of the Intel Corp. 32-bit 80486. This superfast, very expensive ($950) chip crams 1.2 million transistors and 15 million instructions per second onto a sliver of silicon.

• **Continuing RISC ripples.** Although the PC market is dominated by complex instruction set computing (CISC) machines, makers of reduced instruction set computing (RISC) workstations will make headway by offering greater performance at lower cost. "The microprocessor wars are just about over, and I'd say that CISC didn't come out that strong," says Andrew Heller, a consulting partner at Kleiner, Perkins, Caulfield & Byers.

RISC chip manufacturers such as Sun Microsystems, Inc. and Mips Computer Systems, Inc. are banking on chips that they say pack up to four times the performance of conventional CISC designs. So far, RISC vendors have lined up big-name backers such as IBM and Digital Equipment Corp.

• **The lovable laptop.** Small is suddenly very big in PC circles. Snazzy new laptops offer nearly everything found on larger desktop computers — including color screens — but for nearly double the price of an IBM PC clone.

Nicely tailored packages from such big names as Zenith Data Systems and Toshiba Corp. will be joined by promising upstarts like Poquet Computer. Analysts expect that few new U.S. entries will be able to take on the Japanese giants, however.

• **PC multimedia.** Mixing sight, sound and software into a interactive PC package will be one of the exciting wrinkles of the industry in 1990. Boosters say that multimedia applications let users interact with information rather than passively observe it, making it an unmatched educational tool. The Information Workstation Group expects the current $390 million market to hit nearly $1 billion next year and to double that figure in 1992.

Two competing standards — digital video interactive (DVI) and compact disc interactive (CDI) — will make the biggest splash in the multimedia market in 1990. DVI technology involves compressing up to an hour of video as well as audio, graphics and other information into a compact disc/read-only memory format. CDIs are virtually identical to digital audio CDs and hold an hour of audio, graphics, full-motion video and computer programs.

• **Bus battles: EISA vs. MCA.** A movement is afoot to unseat IBM in its standard-setting role on the desktop. This year, keep an eye on the "Gang of Nine" — a group of U.S. and foreign computer firms formed to provide an alternative to the Micro Channel Architecture bus used in IBM Personal System/2s.

Led by Compaq, the group has come up with the Extended Industry Standard Architecture (EISA). Its major battle in 1990 will be to fight the apathy of many corporate buyers. IBM, in turn, must convince customers that Micro Channel is in fact a gee-whiz breakthrough.

The impact on buyers? "Not much," says Andy Hertzfeld, a Palo Alto, Calif.-based consultant. "It's more a political than a technical battle, and third-party vendors have already made it clear that they will support both standards."

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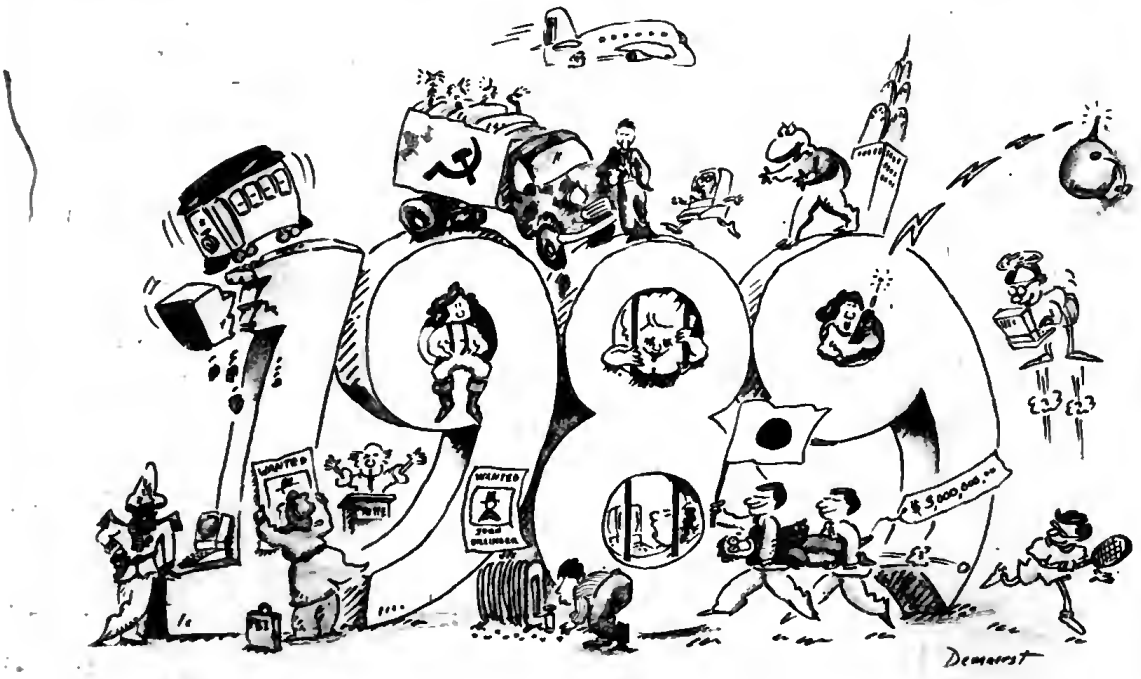

The year of living ridiculously

A nostalgic peek at the events and figures that made us want to go home early

BY PAUL GILLIN
and GLENN RIFKIN

JANUARY

DEC, undaunted by earlier failures at selling personal computers, entered the market yet again. This time, Ken Olsen unveiled 14 different units — all named Decstation — and claimed that while the units are IBM PC-compatible, several run Tops, Ada and a Hidden Valley Ranch flavor of Unix. When questioned about this strategy, the unflappable Olsen replied, "Who cares about PCs, anyway? The press doesn't understand. Our goal is to sell Russian trucks."

•

IBM's John Akers, in an exclusive *Computerworld* interview, said that he wants IBM "to have a sense of humor." To that end, IBM told its customers that Systems Application Architecture is actually a sight gag and was never intended to "be a real strategy."

•

Honeywell Bull entered the new year by announcing layoffs of 1,600 employees in the U.S. Shortly thereafter, disgruntled former employees chipped in to buy a billboard advertisement that shows a group photo underneath the slogan "EXPENDABULL."

•

McDonnell Douglas' IS department features self-managed work groups in which employees are their own bosses. According to Wendell O. Jones, McDonnell Douglas' director of information resource management, the plan worked beyond expectations — except for the slight inconvenience experienced when 14,000 workers simultaneously awarded themselves 50% raises.

•

The Presidential Inaugural Committee used 36 PCs to coordinate and track the month's ceremonies in Washington, D.C. According to Chuck Williams, coordinator of the effort, two machines were dedicated to the actual inauguration, while the other 34 were used to quickly develop an artificial intelligence system for Dan Quayle. Lamented Williams: "I just don't think there are enough MIPS to handle this one."

FEBRUARY

AT&T introduced Teenage Accumaster Integrator Mutant Turtle, a combination systems integrator and robot toy for prepubescent telecom managers.

•

DEC and Apple celebrated the one-year anniversary of their corporate alliance by not announcing anything. Spokesmen for the two firms acknowledged that this nonannouncement is similar to others made throughout the year and that customers could expect similar progress in the months to come. "It's easy to see why there's such synergy between the two companies," said John Sculley, according to an Apple spokesman. Ken Olsen nodded in agreement, according to a DEC spokesman.

•

Herbert D. Zinn Jr., an 18-year-old "cyberpunk" and convicted hacker, became the first victim of the U.S. Computer Fraud and Abuse Act of 1986. For breaking into computers owned by AT&T and the U.S. Department of Defense, Zinn was sentenced to nine months in prison, fined $10,000 and forced to spend a portion of his sentence locked in a cell with Zsa Zsa Gabor.

•

Data General, in an attempt to outdo rival DEC, announced its entry into the hot workstation market with a souped-up series of machines of its own. DG's Unix-based machines will offer 17 MIPS for less than $8,000. Among those left in DG's user base, Edna Funicular, a housewife in Bismarck, N.D., said that she is excited about DG's new offerings: "I'll be able to balance my checkbook and file my recipes in two nanoseconds, which is less than a jiffy."

MARCH

The nation's savings-and-loan crisis took a sharp turn into the IS arena this month when it was revealed that many of the liquidated thrifts might actually shut down their DP operations.

•

IBM took major steps to ensure dominance in the computer-aided software engineering arena by unveiling its plans for a sophisticated repository of software development tools. When asked for his reaction to the plan, analyst Ed Gooley at IDC replied, "Repository? Repository? Oh, thank God. I thought you said IBM was giving the industry a giant suppository."

•

Users of Computer Associates International software were surprised

to find that the company now owned most of the software industry. "I could comment on that," said CA Chairman Charles Wang, "but it's almost lunchtime and I haven't bought anything all day."

APRIL

Hewlett-Packard shelled out $476 million to purchase faltering workstation maker Apollo Computer. Though neither company is known for pizzazz or high profile, HP Chief Executive Officer John Young expressed enthusiasm for the deal. "It's very nice," he said.

•

In an exclusive *Computerworld* survey of CEOs in Fortune 500 companies, 75% of those responding said they'd rather be trapped in an elevator with an insurance man than spend time with an IS professional. The other 25% didn't know what IS was.

•

Wang Laboratories shocked Wall Street and the industry by announcing a $63 million loss for the fiscal quarter ending in March. "When I left to play tennis on my lunch hour, we were in the black," said Wang President Fred Wang. "I get back and someone says we're down 63 mill. Go figure."

MAY

Having captured major portions of worldwide markets in virtually every area of technology, the Japanese quietly targeted the software industry as the last stronghold to be conquered. To that end, Sony, Hitachi and Fujitsu joined together and purchased Bill Gates for $3 billion.

•

IBM, in an attempt to tie together its disparate systems from the desktop to the host, unveiled Officevision as the catalyst to its SAA strategy. "This is a concept that percolated into an idea, and we plan to roll it out into an actual thought in fiscal 1991," explained George Conrades, IBM's vice-president of fuzzy futures.

JUNE

Sun Microsystems stunned the industry with its first quarterly loss. Sun Chairman Scott McNealy admitted that the problem is due to an antiquated accounting system and said the company would not know exact numbers until they were finished picking up the beads that rolled under the radiators.

Ashton-Tate said it will experience a quarterly loss due to swollen retailer inventories and slow sales of Dbase IV. The inventory problem came to light after several people were injured in New York when the floor of a Computerland warehouse collapsed.

•

CA bought ailing Cullinet in a stock swap valued at $333 million. To finance the deal, CA traded stock it swapped for Uccel for the same amount of Cullinet stock, which will be used as collateral in the Applied Data Research stock swap, which was guaranteed at the time by CA's promise to trade stock swapped in a deal to be made later. At a New York press conference, CA Chairman Charles Wang bristled at suggestions that the company's finances were too difficult to understand.

JULY

Responding to industry outrage at its ban on halon-based fire extinguishing systems, the Environmental Protection Agency announced that it had reached a compromise with halon makers. Under the settlement, data center personnel will now be required to wear heavy rubber boots and red suspenders.

•

Compaq signed a broad patent-licensing agreement with IBM, giving it access to all IBM computer technologies. The agreement stated that Compaq would not enter the mainframe market if IBM would stop referring to Compaq Chairman Rod Canion as a "weenie" in releases.

•

Kodak stunned the industry by becoming the largest company to contract its IS operations out to a third-party vendor. Kodak said it expects to save 40% to 50% annually on data center operations by handing the job to IBM.

AUGUST

Kodak's newly appointed IS director, a former IBM sales representative, placed an order for 75 new 3090 mainframes. Kodak said it expects to post a massive quarterly loss.

•

A *Computerworld* survey of Wang users found that most expect to stick with the company during its financial crisis. The same survey found that customers lack confidence in Fred Wang but admit that he has a stunning backhand.

•

Prime appointed a new CEO, James McDonald, trumpeting the fact that McDonald looks a lot like New York Mayor Ed Koch. In his first public statement as head of Prime, McDonald asked, "How'm I doing?"

SEPTEMBER

IBM announced AD/Cycle, its application blueprint for the '90s, to a chorus of guffaws from analysts who acknowledged that yes, IBM sure does have a sense of humor. DEC immediately responded by announcing EL/Cycda, an application blueprint for the '90s that is consistent with IBM's in every way except that it is completely incompatible. Industry analysts praised DEC for keeping them employed.

•

MIT acceded to government demands and installed a U.S.-built Cray-2 supercomputer instead of the Fujitsu machine it had originally chosen. An irate Fujitsu announced plans to purchase George Bush.

•

Apple introduced the Macintosh Portable amid widespread praise for the machine's ergonomic design. Apple executives kicked off an unusual promotional campaign for the Mac Portable by personally riding from San Francisco to New York squeezed underneath airline seats.

OCTOBER

The entire U.S. air traffic control system shut down for two hours when a programmer in Davenport, Iowa, booted up his PC. Officials blamed the weather.

•

A powerful earthquake rocked Silicon Valley, the nation's high-tech heartland. Fujitsu told the U.S. government to lay off university procurements and cautioned that "this was just a warning."

•

DEC entered the mainframe market, tying together 156 of its VAX 6200s into a massive Vaxcluster. DEC pointed out that the so-called VAX 967200 offers 15 times the processing power of an IBM 3090 while only taking up 40 times the space. Asked what DEC can possibly hope to accomplish by offering poorer price/performance than IBM, DEC Chairman Ken Olsen answered, "Yes."

NOVEMBER

In a surprise move, Compaq entered the midrange market with the Systempro line, featuring multiple disk arrays and a mainframe-like bus architecture. Compaq described the system as being designed for "extremely intensive work, such as thermonuclear research, chemical compound modeling and war game simulations."

Iran ordered 10,000 Compaq Systempros.

•

Kendall Co., which put a massive IS centralization program in place and then switched to a massive IS decentralization program, decided to eliminate the post of IS director. "We've made him a corporate consultant," said a Kendall spokesman. "And he's currently evaluating an outsourcing program."

•

Dun & Bradstreet acquired software maker MSA and merged the Atlanta-based company with McCormack & Dodge to form a $200 million unit of D&B. The new unit, to be called D&BMSAM&D, is said to already be negotiating with Computer Associates, Microsoft and Lotus to form one giant software conglomerate that will be headquartered on the planet Nutron.

•

As the Berlin Wall came down, fear spread among the Eastern Bloc countries that they will lose their best technical minds. "This could be very depressing," said ao East German official. "We were all set to introduce our new VAX line in January."

DECEMBER

Procter & Gamble was among many large corporations hit by hackers infiltrating its network to make illegal long-distance phone calls. "We noticed something was funny when we had a $7 million phone bill for calls to the planet Nutron," said a P&G spokesman.

•

Unparalleled merger activity changed the face of the industry. Adapso, the industry trade group, announced that it will be disbanding and that all of its calls will be routed directly to CA. Urgent calls to the U.S. Federal Trade Commission were greeted by, "Hello, Mr. Wang's office."

•

In stunning news that swept across the industry, IBM announced that it will lay off 10,000 employees and take a $2.3 billion writeoff in the fourth quarter. A subdued Chairman John Akers told analysts that the era of IBM as Mr. Nice Guy is over and appointed Fred "Mohammar" Ramboski as marketing director. In recognition of its newly acquired focus on profitability, IBM declared 1990 "The Year of Kicking Butt."

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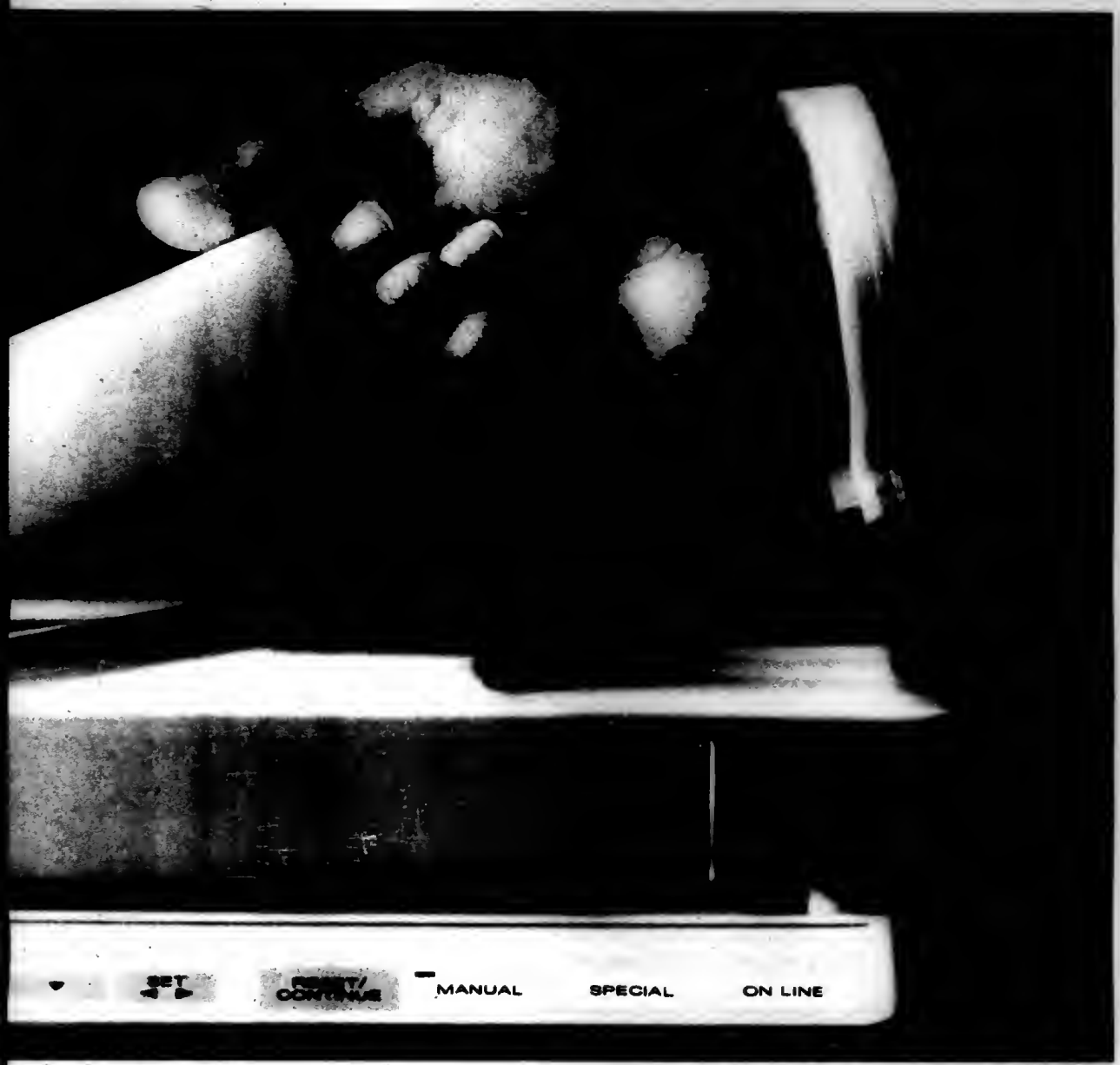

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EDITORIAL

Things change

Watchman, tell us of the night,
What its signs of promise are.
John Bowring

EVEN THE MOST jaded industry observer would stand in awe when summarizing the pace of change within the information systems environment in the decade just concluded.

Arguably, there has been no greater change in such a brief span of time in any other industry than the computer industry. But what was even more amazing was the ability of business to absorb and assimilate these changes.

From the beginning of the decade, when there were fewer than a half-million desktop computers in U.S. workplace, the face of business has undergone a virtual makeover. Today, three out of four white-collar workers toil in front of a tube. This translates into a 100-fold increase in the numbers of intelligent desktop devices in use over 10 years and a *2.5 million-fold increase* in the amount of raw computing horsepower on the desktop.

Therein lies the germ of change in the decade now before us. The vast majority of some 60 million megabytes of RAM sitting on the desktop of U.S. business is doing just that — sitting. The techno-changes under way, which are designed to harness that monster engine, will alter the workplace and the IS environment to an order of magnitude far greater than did the changes of the 1980s.

And there is the greatest challenge for IS: walking that thin line between fostering the proliferation of information technology throughout the corporation and controlling it so that the beat of technology is in harmony with the overall business plan.

It is encouraging to see that IS largely recognizes this challenge, as evidenced by the technology wish lists expressed in this Forecast 1990 issue. The most sought-after items address the fiscal prudence stressed from above IS (portable software and open systems in general) as well as below at the user level (more robust networking facilities and far more secure PC networks).

It is further encouraging to see IS expressing its needs and desires to the vendor community more effectively than at any other time in the brief history of information systems. Customers are snubbing major hardware vendors that stick tenaciously to proprietary architectures. The PC software makers are feeling the wrath of corporate buyers that increasingly won't do business with vendors that listen to one another more than to their customers. Slowly, painfully, they too enter this decade of great promise and great change.

But the most important change in this decade will come in the workplace itself, where the curtain will fall on the age of specialization, the last convulsion of the Industrial Revolution. The tools that enable workers to perform different sets of tasks in accordance with changing business conditions will be the legacy of IS when we write our first editorial in the year 2000.

LETTERS TO THE EDITOR

Safe opening

To depend on one or two software companies for direction is very dangerous. A case in point: Graphical user interfaces and operating systems dominated by Microsoft and IBM. Windows systems should be open to all developers; after all, Microsoft did not develop Windows, the mouse system or Xenix for that matter.

To have one company monopolize GUIs such as Presentation Manager or Windows results in confusion. Openness will lead to improvement through competition and cheaper prices. Openness in operating systems will certainly lead to improvements, as they are becoming increasingly complicated and memory-intensive.

Arthur Winkler
Franklin Park, Ill.

Good hunting

Regarding "Selecting a good headhunter" [CW, Nov. 6], while it offers some very important advice, it was incorrect in that a headhunter is not in a position to get people positions that will offer exposure to better technology or a better career path into management. Those are the most important reasons to consider taking a new position, and a good headhunter should be in touch with market trends and market positions to provide those options.

A headhunter should use "intangible" criteria to evaluate candidates as well as crucial criteria such as technical competency. A person with an aptitude and interest in learning new technology might be a better candidate than one who is tired of the technology and won't work out over the long term.

Furthermore, a good headhunter should be in a position to help in the decision making. While we aren't technically career counsellors, we are capable of being honest and informed enough to help people choose the right path. Most good headhunters depend on referrals from satisfied clients.

Paul Rosier
Vice-President
Career Concepts
West Burlington, Mass.

On-line manuals

Hear, hear to your Training column "Ten steps to terrible manuals" [CW, Oct. 16]! According to this article, most user manuals might just as well be called "useless manuals." Poor design and a writing style that requires a dose of Pepto-Bismol to stomach does not encourage even the most dedicated of users to refer to system documentation.

We'd like to take that one step further: We believe that most user manuals might just as well be called "user-less manuals." Most of them just sit on the shelf. Let's face it, at the least, getting to a user manual involves a certain amount of physical exertion: getting out of your chair, lifting the manual and so on. And then there's the mental exertion involved: trying to locate critical information, wading through jargon and locating diagrams.

On-line documentation gives users the information needed right there on their screen. With these products, users can find precisely the information they are looking for without leaving the context of the work they are performing.

Paper manuals pull users away from their work; on-line documentation, organized properly with hypertext links, quickly delivers answers concurrently with transaction processing.

On-line documentation does not mean that the writing inside it will necessarily be clear, but it speeds access to critical information and promotes peak productivity from users — and it keeps a manual from being, as your article put it, "relegated to its proper role as a footrest."

Bill Braasch
President
Data Base Architects, Inc.
Alameda, Calif.

CORRECTION

The Dec. 4 editorial "Warm fuzzies" incorrectly stated that Computer Associates International, Inc. had scrapped plans to discontinue a mainframe security system in 1987.

A subsequent correction [CW, Dec. 18] noted that it was not CA but Uccel Corp., acquired by CA, that had planned to discontinue support for the system.

In fact, neither CA nor Uccel Corp. have discontinued or ever planned to discontinue support for a mainframe security system. We deeply regret these reporting errors and any problems that they have caused CA or its customers.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Gaze at IS' future through my crystal ball

MICHAEL COHN

I like to know what's going on. That's why I frequently find myself in the eight-items-or-less line, perusing the tabloid headlines that keep me abreast of important world events. For people like me, this is a very exciting time of year.

1990 is almost upon us, and it's time for the sages and seers to make their predictions of what to expect in the coming year. I must know about impending disasters. I need to be forewarned about celebrity divorces. I'd like help picking my lottery numbers.

High-tech should not miss out on all the fun. I am going to go out on a limb and save the industry millions of dollars and countless moments of agonizing speculation. I am going to make some high-tech predictions for 1990.

Brace yourself: 1990 is going to be an amazing year. I will try not to be too tabloid-sensational and will forego my prediction that Steve Jobs' brain will be kidnapped by Unidentified Flying Objects and entered in some intergalactic Nintendo tournament (I mean it, it's going to happen).

Instead, let me just hit the high-tech high points. Plan your careers accordingly. Get your stock market investments ready. Because in 1990, I predict that the following is going to happen:

• The dominant computer maker will announce yet another family of products intended to revolutionize the way we develop applications, change the way we store data and cut down on our between-meal snacks. A prototype will be rumored to be running in a bank in Minnesota, and general availability will be slated for sometime prior to the next solar eclipse.

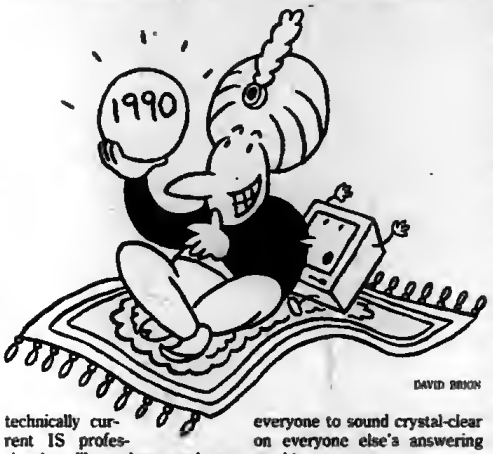
• A hacker at Yale University will infiltrate the Central Intelligence Agency's top-secret Central America database and totally scramble our plans for international policy.

Regrettably, several months will pass before anyone can tell the difference.

• A budding computer organization, already known for its black, cube-shaped personal computer, will shake up the industry by developing a prototype for a tiny, black, six-ounce portable.

Unfortunately, it will be mistaken for a charcoal briquette at a company outing and be totally destroyed.

• The shortage of qualified and technically current IS professionals will continue, and my cousin in Hackensack, N.J., will still be able to pull down $80,000 even though he is an idiot.



DAVID BRION

• A rapidly growing computer services company, known for its hungry acquisitions and mergers, will be unceremoniously bought out by Donald Trump and turned into an airline reservation system.

• The globe will become completely connected by buried fiber-optic cable, just in time for everyone to sound crystal-clear on everyone else's answering machine.

• Additional computer companies will fall on hard financial times, and thousands of middle managers will be cut from their ranks.

Fortunately, they will quickly be reabsorbed into the job force as used-car salesmen and National Football League instant replay officials.

• A major oil company will fall prey to a huge computer embezzlement scheme costing more than $1 billion. It will be faced with the very difficult moral decision of either eating this incredible loss or passing these costs on to its customers.

• The confusion as to what is and what is not CUA-compliant will finally be resolved. The major computer organization behind CUA will completely redefine its requirements in order to make them optimally understandable to those in the business community.

In order to be CUA-compliant, a system will need three essential components: a joystick, tiny little spaceships and at least one Ninja warrior.

• China will finally unveil its first competitive hardware product for the international market. Sales will be impacted, however, when customers who run their jobs discover an inexplicable urge to run them again an hour later.

• A much-publicized services agreement between a U.S. photography company and a computer giant will fall apart when it is learned that all computer printouts must come in full-color, glossy, 5- by 7-in. and 8- by 10-in. sizes.

Cohn is a quality assurance representative based in Atlanta.

In praise of the decade, this column's for you

PAUL GILLIN

All right, listen up, information systems professionals, because this won't be your standard IS column. This column won't take you to task for not having the financial savvy of your corporate controller, the technical wizardry of your best programmer and the vision of your chief executive officer. It won't score you for not having a love affair with your users. And it won't lecture you on the need to tell vendors how to do their job.

No, this column's for you.

Amid all the head-banging and self-flagellation IS professionals must engage in these days, you sometimes forget that what you have accomplished in the last decade has been truly remarkable.

Consider this: In 1980, the average data processing shop consisted of a hallowed mainframe locked up in a steel and glass monastery, tended to by technology wizards with knowledge of mystical foreign languages. You labored in sweet isolation from the rest of your business. Like drone bees, your function was to protect and serve the mainframe queen. The sanctity of the tools of your trade was ensured by their inherent complexity. Not only did users not want to invade your space; they wouldn't dare!

How things change

Ten years later, the typical IS shop still nurtures its delicate mainframe, but as a slave to an army of terminals and workstations linked throughout the company. In fact, if you work for a Fortune 500 company, chances are there is more computing power sitting on desktops than churning in the data center. That's pretty good for you people who have had to live with the "mainframe bigot" label for the last five years.

The new IS professional's role is to be a technologist with enough business savvy to outdo the businessman. It's not enough to automate, we're told. IS has to "re-engineer" the corporation.

Talk about change. No other profession has endured that kind of fundamental upheaval in the last decade and lived to tell about it. How would accountants react if the double-entry method of accounting suddenly became obsolete? What would marketing professionals do if they could no longer use the U.S. mail? How would manufacturing industries react if someone like, say, Japan came in and said all the rules have to be rewritten?

Well, you get the picture.

Take a bow, IS, because you've not only survived, but prospered. The U.S. may not be the economic power it once was, but our corporate computing strategies are the envy of the world — including the Japanese, who have yet to settle on their own personal computer standard.

Consider the revolution in end-oser computing. The IS profession took a lot of well-deserved lumps back in the mid-1980s for letting the PC slip through its fingers. But today that's a dead issue. Not only are PCs now part of the fabric of most IS departments, they are being meshed with the big systems that run the business. IS may not have seen the value of PCs when they were still being used as big desktop calculators. But once IS saw the value, it latched on to them with a vengeance.

Five years ago, I heard an IS manager from a major food concern tell a user group about how his firm had solidified its end-user computing strategy around IBM 3270 terminals. The firm had consciously chosen to keep PCs out of the company, he said. Two years later, I read an article about that same firm praising its strategy for buying and supporting PCs as an industry model. Talk about adaptation.

Consider the new role of information systems as a competitive wedge. Three years ago few had even heard of the term "strategic information systems." Today, it's a cliche, thanks to the speed with which IS executives have seized the concept, discarded the irrelevant rhetoric and begun applying it to their businesses. We're a long way from realizing our potential for using information strategically, but there's not a corporate IS executive in the country who is not now looking at his business through the strategic information lens.

THE SELF-PRESERVATION instinct still exists, but we are seeing IS take the leading role in cutting its own expenses because it's good for its corporate image.

Consider your own vulnerability. Not long ago, IS had the image of being corporate empire-builders with run-amok budgets. Today, the move toward outsourcing and cost reduction is being led, in many cases, by IS executives. Yes, the self-preservation instinct still exists, but we are seeing IS take the leading role in cutting its own expenses because it's good for its corporate image.

As we turn the corner on a new decade, you IS professionals can expect to come in for more criticism. Corporate management is beginning to ask legitimate questions about why computerization isn't improving the productivity of the white-collar work force. They'll want you to stop focusing on automating what already exists and think about changing the way things are done. They'll insist more than ever that projects deliver what they promise and do it on time and within budget.

If anything, the next 10 years will be more nerve-racking than the last 10. But that doesn't mean you shouldn't stop for a moment and reflect on how far you've really come. Kick off your shoes on New Year's Day, IS. It's been a fruitful decade.

Gillin is *Computerworld*'s executive editor.

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HARD TALK

Rosemary Hamilton

Promises to keep

On the large systems front, IBM had the chance to wrap up 1989 on an upbeat note. But it didn't quite make the grade.

As it approached the end of the year, it had a new mainframe line, the 3090 J series, and a new disk drive, the 3390, to get itself beyond the problematic predecessors of both products. But by the last week of the year, it did not look like that would instantly happen.

First, the mainframes. Once again, IBM has a situation on its hands in which some people are scratching their heads and wondering what the heck is going on. And this is not good. IBM can not afford to have confused users on its hands. When the J series was announced, industry observers said it was critical for IBM to hit the ground running with its new systems after the less-than-successful year it had had with the S models.

Observers looked at it this way: Given that the S models planted seeds of concern in users' minds, the follow-on mainframe had to go out flawlessly or users would start backing off.

At the J series introduction,

Continued on page 54

Systems by association

BY ELLIS BOOKER
CW STAFF

CHICAGO — Receptionists at Smith, Bucklin & Associates, Inc. greet callers with a cheery "Association headquarters." Yet, few of these callers probably know that *their* association — be it the American Society of Nephrology, the Soyfoods Association of America or the International Formalwear Association — is just one of 153 trade groups managed here.

The world's largest association management firm, 40-year-old Smith Bucklin is a great believer in information systems to support the needs of its clients with everything from desktop publishing of newsletters to massive member databases.

In October 1988, the company migrated from its IBM System 36 to an IBM Application System/400 Model 50. The AS/400 is connected to six 3Com Corp. servers on a 3Com Token-Ring network, which links around 220 personal computers, mostly IBM Personal System/2s. In addition, it uses a handful of Apple Computer, Inc. Macintoshs linked via Appletalk.

To support its clients and properly bill them, Smith Bucklin uses a suite of automated accounting systems. One tracks the utilization of the AS/400 by client account. Another, now in a test phase, will replace manual, paper-based time and billing with on-line record-keeping.

Eventually, said firm Vice-President Henry Givray, the company would like to be able to identify local-area network use and recover these costs. He said the firm hopes to move completely to transaction-based billing by 1991.

Smith Bucklin's functions are divided among three integrated software packages: a membership database, which contains customized code for many of the associations; an

To page 54

Smith Bucklin's *Givray, left, and Podany*

Concurrent fields fat federal pact

BY MARYFRAN JOHNSON
CW STAFF

WASHINGTON, D.C. — Uncle Sam will be signing a lot of paychecks this coming year at Concurrent Computer Corp. in Westford, Mass., where the U.S. Air Force has awarded a $2.6 million research contract to design and pilot a distributed, real-time operating system.

When ready for public release late next year, the software — named Alpha — will be the first off-the-shelf, general-purpose public domain operating system for the real-time environment.

"Alpha could be applied any place where we have time-critical applications, such as battle management, communication and control," said Thomas Lawrence, program manager for the Alpha Project at Griffiss Air Force Base in Rome, N.Y.

Serving as application support contractor is General Electric Co.'s Advanced Technology Laboratory and Strategic Systems Division in Morristown, N.J. The GE laboratory was awarded a $380,000 contract from Concurrent to develop fault-tolerant applications for defense battle management and command and control systems.

One ground-breaking aspect of the Alpha technology will be its ability to provide an environment for development and execution of distributed applications, Lawrence said. "Complex systems have software development as their major cost. Making a dent in that cost is the long-term payoff for Alpha," he said.

Alpha net

The Alpha operating system would handle network management, while Unix runs the computer and real-time executives handle board-level transactions.

"Networked computers sharing Alpha act like one big computer system. Alpha can run on each node, or with Unix on individual computers in the network," said Bill Blunden, product marketing manager at Concurrent. "The idea is not to specify the way people use this technology, but to provide a broad set of tools to interoperate."

Alpha began at Carnegie-Mellon University, where former professor E. Douglas Jensen, now a chief scientist at Concurrent, developed it for his government-funded Archons research project.

Pilot versions of the operating system will be installed in late 1990 at government and industrial sites. Initially, Alpha will run on Concurrent's reduced instruction set computing multiprocessor nodes interconnected into a distributed system with Fiber Distributed Data Interface for its network.

Association

CONTINUED FROM PAGE 53

event management system for making hotel and travel reservations and tracking attendance at events; and a financial system.

"We customize the front end and the back end of the programs for all 153 of our clients," said Randy Podany, director of Smith Bucklin's 19-person IS division. "The challenge for us is how to keep the internal code standardized."

Information technology associations are Smith Bucklin's fastest growing business. It now claims 13 such groups, including the three largest IBM user groups in the nation.

That has raised the issue of security as computer-savvy associations begin to ask for on-line access to Smith Bucklin's computers.

As Podany puts it, "We've got associations with many talented hackers . . . and if there was a security problem, they'd be happy to point it out to us."

For this reason, Smith Bucklin matches its own tight internal IS security measures with a policy of no outside access to the AS/400.

However, Givray concedes, "there is a lot of demand for electronic links between the users and the [association] headquarters," adding that one association client is piloting a system whereby members can upload and download files — for example, papers submitted for a conference.

Hamilton

CONTINUED FROM PAGE 53

IBM said that it would begin immediate delivery of J models and that it would also continue to keep the S series available for purchase.

But in early December, an angry user said be was getting a runaround from IBM. He had an S model on order prior to the J announcement that was automatically rolled over to a new model order. Now, IBM was telling him he could not have a J until sometime later this year. What happened to immediate delivery?

Another user with an S model on order is also now in line for a J model. According to this user, IBM took away the option to move to an S. When this user pushed for an S, he was told he could not have it until next year. He agreed to go with a J in 1989. It was first scheduled to arrive before Thanksgiving and was then rescheduled for early December. The customer elected to install it over the Christmas weekend and, at last check, was counting on that delivery date. But why couldn't he have an S model in 1989 if be wanted one?

When IBM was contacted about these users, a company spokesman said demand for all 3090s outweighed supply and the company was doing its best to accommodate customers.

Even if the two users mentioned above are isolated cases that do not signal a trend, the fact is IBM said J models were ready for immediate shipment and S models were still available. It said this. Now, it says demand ontweighs supply.

Are we to believe that new S and J model demand snuck up on IBM and caught it unprepared? This should not he the case with the two users whose demands were already known. If it did not have enough J and S models to accommodate such users, then it should not have indicated that it did.

We cannot fault IBM if demand outweighs supply. But we can fault it for giving the impression that it was ready for the large system customer base when in reality it has to juggle its supply to handle customers on a case-by-case basis.

This is not the way to keep the whole group happy, and it had better be trying very hard to accommodate all its users as 1990 begins.

Let's end the column on a happy note, however. On to the topic of disk drives: There is little to report here, although these days no news is good news when it comes to IBM and its disk drives. At year's end, it was hard to find a user who had taken delivery of the new drives, but folks were generally positive about the product and making 1990 plans for it.

Hamilton is *Computerworld's* senior editor, systems.

HARD BITS

DEC teams up with newcomer to sell VAXs

Maspar Computer Corp., a newcomer to parallel computer systems, recently announced a business alliance with **Digital Equipment Corp.** to sell the Vaxstation 3520 as the front-end processor for Maspar's Unix-based system.

The actual product — with software built on Ultrix, DEC's version of the AT&T Unix System V operating system — is not scheduled to be introduced until early 1990.

Norad Corp., a maker of protection shields for VDTs, announced a hot line service to distribute information about VDTs and radiation dangers. Norad, which is based in Santa Monica, Calif., is expected to launch the information hot line this month.

The company will distribute information based on government and private sector studies on VDT safety.

MICRO BITS

Patricia Keefe

The ghost of glories past

With any luck, 1990 will signal the end of the '80s as we knew them. What began with great promise culminated into piles of vaporware, vengence and not-all-there products. The decade, which spawned a frenzy of technology innovations between 1983 and 1988, now limps off into memory.

The past year saw mudslinging escalate into an art form, dogging vendors who were already racing to avoid red ink while seeking to capture scarce market share.

Those who weren't busy gobbling up other companies or trebling in size at the drop of a hat managed to mire themselves in paralyzing religious wars over operating systems, windowing and server environments.

Suppliers not hindered by lawsuits found themselves at the mercy of increasingly sophisticated technology, which led to a rising incidence in buggy releases and missed deliveries.

The lack of timely, ready-to-roll software fed the resentment of users who were already irked both at the pressure to convert

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Desktop X-rays

UCLA's medical center benefits from its PACS

ON SITE

BY JAMES DALY
CW STAFF

LOS ANGELES — At first glance, one would be hard-pressed to draw similarities between a stack of X-rays and some dog-eared library books. But radiologists often battle the same uneven user habits that perpetually drive librarians crazy: documents become overdue, misfiled or even lost.

However, the implications of losing the chest X-ray of a seriously ill cancer patient are far more serious than trying to track down the last copy of *Treasure Island*.

As a result, the radiologists and information systems staff at the University of California at Los Angeles Medical Center have joined to clean up the sometimes eccentric X-ray filing habits of the radiology department at this 700-bed hospital.

The film images that have formed the cornerstone of radiology for decades are being replaced with a workstation-based picture archiving and communications system, termed PACS, that allows digitized on-line X-rays to be called up from a series of desktop stations then examined and refiled in minutes.

The result is a system that not only speeds data retrieval and efficiency at UCLA but may also have major implications for improving both image data management and patient care at hospitals throughout the world.

"The advantages are enormous," said Ricky Taira, an assistant professor at the school. No longer must physicians scramble for the same X-ray, wait 20 hours for the film to return from the developer's lab or visit a series of departments to get a complete head-to-toe X-ray portrait of a patient.

Instead of using film, patients' data is collected on phosphorescent plates. The energy given off by the electrons on the plate is then translated into a digitized form by a laser-beam raster scanner.

The scanner feeds the data into a Digital Equipment Corp. VAX-11/750 specifically designed for the task. The information is maintained on Eastman Kodak Co. 14-in. optical discs housed in an automated disk library that uses advanced robotics to change and "play" the optical discs, in much the same way a jukebox handles phonograph records.

PACS *can examine digitized X-rays in minutes*

The high-quality images can then be viewed and manipulated on a series of Sun Microsystems,

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Zenith disc controller claims raise doubts

BY RICHARD PASTORE
CW STAFF

Zenith Data Systems has been bragging since Comdex/Fall '89 that its upcoming EISA-based personal computer will feature a mass storage controller with a shattering 1-msec average seek time. But some observers are not buying it.

To claim an *average* seek time of 1 msec "is extremely misleading," said Robert Katzive, a disk drive expert at Los Altos, Calif.-based research firm Disk/Trend, Inc. Average seek times are dependent on the method in which the PC is used. A 1-msec seek time may be possible, but only under restrictive, ideal conditions, he said.

The average seek time on current PC devices is about 16 msec, Katzive said. But Zenith insists that its Z-386/33E machine will blow that average away. The Intel Corp. 80386-based PC is the first in Zenith's Extended Industry Standard Architecture (EISA) line.

"This is a new design to take advantage of the EISA bus," a Zenith spokesman said. "Part of the key to its speed is a memory-caching feature and its 32-bit bus-mastering ability."

"Unless the cache is as big as the disk drive itself, there'a no guarantee that what you are looking for is going to be in the cache," Katzive said. He contends that a cache big enough to ensure an average 1-msec seek time would be too costly to implement.

Zenith would not specify the size of the cache in its planned system other than to say it is large. Other proprietary technologies augment the speed by optimizing use of the cache, according to the company. "We are talking about patents pending," the spokesman said.

Keefe

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to a new, costly environment and the lack of consensus about what that should be. Some, "mad as hell" and determined not to take it anymore, put away their wallets.

The resulting sting spread across the bottom lines of both hardware and software providers, leading to gloomy outlooks for 1990 on growth in the personal computer industry.

And just when you thought it was safe, WHOMP! Another earth-trembling suit rocks the industry. Xerox recently rear-ended litigious Apple with its own suit for — you guessed it — copyright misappropriation. (That's a legalistic term for sticky fingers, as Apple knows.)

Talk about better late than never! There are those who believe that many good technology innovations have their roots in decade-old Xerox Palo Alto Research Center research. So, where the heck has Xerox been for the last few years? *Now* it wants to get testy about the Macintosh interface? What Xerox really needs isn't a win in court; it's a time machine, even though no one deserves to lose more than Apple.

Despite a somewhat rancorous year, 1989 did have its share of good news. IBM and Microsoft kissed and made up, designating operating system and windowing standards in unison.

Lotus finally shipped key products: Release 3.0 of 1-2-3, a networked version of 2.2 and Notes. SQL back ends fell into place fronted by competing benchmarks. We're still waiting on those front ends.

By contrast, 1990 should be the year of the big product rollout — you know, all the stuff that missed 1989 deadlines and more. The question is whether corporate America, which could find itself squeezed by a recession, will take the bait and spend big bucks. If it doesn't, the trend in belt-tightening, layoffs and "disappointing" quarters will continue.

This would make for a pretty dicey situation for the gaggle of minicomputer makers and offshore manufacturers, which have decided that now is a good time to try and crack the U.S. personal computer market. Such optimism isn't shared by the current players, many of whom are offering conservative growth estimates for next year's sales.

Software sales may be another story. In 1990, watch for an endless stream of OS/2 and groupware applications introductions. This includes details from IBM and Microsoft on just exactly how IBM plans to make OS/2 Extended Edition available to users and third parties. Concurrently, evidence is piling up that indicates Microsoft — despite previous denials — intends to go direct with LAN Manager. Why not, given that Microsoft has succeeded in wrenching exclusive marketing rights to SQL Server away from the woeful Ashton-Tate? Just another event preceded by adamant denials.

Look for Lotus to deliver versions of 1-2-3 for IBM mainframes, Unix, DEC's VMS and OS/2. It might also unwrap a Windows version of 1-2-3.

Get ready for an avalanche of Extended Industry Standard Architecture (EISA) and Intel I486-based systems and boards to hit retail shelves now that chip problems have been resolved. They'll be joined by a slew of bus master cards for both EISA and Micro Channel Architecture systems.

Finally, the attack on minicomputer territory will escalate. Centralized servers based on this technology, coupled with distributed applications, will entice more IS departments to dabble with client/server models.

Keefe is *Computerworld's* senior editor, PCs and workstations.

Zenith

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Inc. and Stardent Computer, Inc. workstations. The on-line X-rays can also be called up on the fly from several secondary review monitors, although legally those images cannot he used for a final prognosis because the representation is not as sharp as that of the workstations. The images can also be transferred onto film by using a laser film printer.

The uptick in patient care has shown up in several ways. UCLA currently keeps X-ray films on-site for as long as six months before storing them at a nearby Santa Monica facility. Retrieval of the older X-rays usually takes a minimum of 24 hours; PACS has pared that down to several minutes, allowing physicians to quickly perform retrospective studies.

"We can spend time with patients, instead of looking for information," said Bernie Huang, professor and chief of UCLA's division of medical imaging.

Although PACS makes life easier at the center, it was a tough sell initially. "Radiology has been practiced the same way for 80 years, and there was quite a bit of inertia to overcome," Taira said.

Nostalgia quickly disappeared in the face of improved medical care, however. Huang cited one study in New York in which a resident on duty for 36 hours had spent 30% of his time looking for patients' records.

PACS is going over so well that interest has been sparked at medical centers at the University of Pennsylvania, University of Kansas and Georgetown University.

"In the general scheme of things in radiology, PACS took a long time to get into the channel," Taira said. "But right now it seems irreplaceable."

DATA STREAM

Elisabeth Horwitt

The year in limbo

A poem by Walt Kelly, the creator of Pogo, ends up with a call for us all to rejoice in "the will-be that was." This past year, communications managers were all cursing about the "should-be'a that weren't." Among the desirable products and technologies still hovering in limbo land are the following:

- Multivendor network management. The culprits, vendors say are the International Standards Organization and other standards bodies for failing to deliver a true Open Systems Interconnect (OSI) network management standard. Nevertheless, they will be happy to sell users a pre-OSI, partially proprietary network management system with the understanding that sometime in the next year or two, migration to OSI will take place.
- Viable Integrated Services Digital Network (ISDN). Again, vendors say incomplete standards are the culprit, preventing different types of ISDN equipment and services from talking. Various major computer vendors and local carriers also say they are waiting for market

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Guarding the network gates

Unisys' Blacker serves as a multilevel sentry for intelligence networks

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Defense Communications Agency (DCA) will be able to merge three intelligence networks, each one with a different security classification, into a single network, thanks to a multilevel security system called Blacker.

Information with different classifications will be able to ride on the same packet-switched backbone network while Blacker controls access depending on the user'a need and classification, according to Unisys Corp., which developed the Blacker hardware and software for DCA.

The long-planned consolidation is expected to result in lower costs as well as greater flexibility and survivability. Now, DCA's packet-switching Defense Data Network has one network for data classified as "secret," one for "top secret" information and a third one for the highest classification, "top secret with special compartmentalized information."

A star is born

Blacker has been under development since 1982, but "it has taken until now for Blacker to reach maturity," according to Ronald Elliot, technical director of the Defense Intelligence Agency's Intelligence Communications Architecture Project. Unisys recently announced that Blacker has emerged from its development phase and is now in production.

Blacker provides end-to-end encryption for packet-switched networks, which means that the message stays encrypted throughout the interconnecting links, Unisys said.

It is in the process of being evaluated by the National Computer Security Center for an A1 security rating, which is the center'a highest.

With conventional encryption, the message and its address are encrypted as a single unit; therefore, the whole message must be decrypted at the packet-switching nodes so that the address can be read and the message forwarded.

With Blacker, however, the address appears in plain text but the message is decrypted only at its destination.

Although Blacker was developed specifically for the Defense Data Network, it has applications in other government networks, Elliot said. For example, packet networks with Blacker encryption could be used for mobile battlefield communications, he said.

In addition, Elliot said that Blacker encryption could be added to the Federal Telecommunications System 2000, the nationwide network that is currently being installed, and the Department of State'a packet network.

Wheels set in motion for final FDDI hurdle

BY JOANIE M. WEXLER
CW STAFF

Still bucking for approval of the Station Management portion of the Fiber Distributed Data Interface standard at its February meeting, the SMT Working Group will push a new SMT document out the door in a January mailing to committee members.

The SMT portion of the FDDI standard — the final componeot awaiting the X3T9.5 FDDI technical committee's approval — addresses configuration and systems management, fault isolation and recovery in an FDDI ring. Approval of the final FDDI component should give customers a wider array of FDDI alternatives as more vendors enter the market with standard-compliant products.

Floyd Ross, who is vice-chairman of the X3T9.5 committee and chairman of the SMT Working Group, acknowledged that completing the new document might be "too much to swallow" for a February roll-call vote and could spill over to the committee's April meeting.

Incorporated into SMT Revision 6, according to Ross, will be the functionality requested by a separate but cooperative entity, the SMT Development Forum. The forum reportedly advocates management of the entire 100M bit/sec. fiber ring at the first two layers of the Open Systems Interconnect reference model

[CW, Dec. 4, 1989].

Ross explained that once the technical committee signs off on the SMT document, it must be forwarded through an approval hierarchy that requires eight to 12 months to render the document a published American National Standards Institute standard.

To accelerate the deployment of FDDI, a facility called the Interoperability Test Center is under construction at Advanced Micro Devices, Inc. (AMD) in Sunnyvale, Calif., where vendors will test their FDDI products for compliance to the standard and interoperability with each other.

The facility is scheduled to be in place by the end of the first quarter of 1990.

AMD has been running informal interoperability testa with a variety of vendors on its premises since last April to demonstrate to the networking community that FDDI is feasible.

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demand — which obviously will not develop until ISDN works throughout the U.S. on users' favorite networking and computing equipment. And so it goes.

• Integrated local-area network management. Sure, there are isolated tools such as Sniffer to diagnose LAN problems, but users want LAN diagnostics to feed into the corporate network management system. That way, their limited staff of experts do not have to fly around the country or talk people through testing over the telephone.

Vendors such as 3Com, Novell and Ungermann-Bass have made noises that they will support IBM's Netview, DEC's EMA or Hewlett-Packard's Openview, but that is still just talk.

• Computer-integrated manufacturing (CIM). This year, IBM, DEC and HP made a big show about their "architectures," which provide a framework for CIM. But they are only just beginning to provide tools and services that might make CIM feasible for the masses and not just for GM, Deere and Boeing.

For those who are tired of being frustrated about the same old vaporware, two areas emerged in 1989, each with its own confusing terminology.

In the area of high-speed wide-area networking, vendors have been talking up sonet, fast-packet and broadband ISDN, all of which are supposed to mesh into cost-effective, reliable, multigigabit/sec. connections in the mid-1990s.

One expected source of demand for high-speed networks is distributed computing. A number of firms seem to be gearing up for distributing their applications across various types of computers and networks during the next decade. But they will need an appallingly complex set of tools, including remote procedure calls, naming services, directory services, location brokers, object-oriented this and that and data repositories.

The Open Software Foundation is currently trying to get orderly standards out of this chaos, and I wish it luck.

To end the year on a positive note, let us mention several instances in which users made vendors buckle down and work together toward interoperability:

Various electronic mail services — even MCI and AT&T — have agreed to interconnect using the X.400 standard.

DEC and IBM have finally joined the OSI Network Management Forum.

IBM is starting to support OSI and Transmission Control Protocol/Interconnect Protocol across a growing number of its major systems.

Competitors are increasingly getting together for joint testing to ensure that their products interoperate under standards such as Fiber Distributed Data Interface and ISDN.

Happy New Year.

Horwitt is a *Computerworld* senior editor, networking.

AT&T, MCI interconnect X.400 E-mail

BY ELLIS BOOKER
CW STAFF

Rivals AT&T and MCI Communications Corp. recently bowed to user pressure to interconnect their electronic mail services by using the X.400 protocol.

The two rivals' linkage follows a rash of similar announcements among the major U.S. E-mail carriers during the past year. Users of the two companies' services will be able to interchange messages beginning in February, the two carriers said.

The X.400 link between AT&T Mail and MCI Mail is a protocol developed by the CCITT.

"I'm really encouraged by this commercialization," said Steve York, chairman of the Washington, D.C.-based Aerospace Industries Association (AIA), which represents 55 of the nation's largest aerospace companies.

Pressure pays off

Earlier this year, AIA successfully pressured several E-mail carriers, including MCI and AT&T, to establish X.400 connections for its members. "Out of a total of 21 different [X.400] connections that AIA is looking for, about one-third are commercially available," York said.

However, standardized directory services — described by the less mature CCITT X.500 protocol — are not yet available. The lack of a common electronic directory requires that users sending messages to the other services must precisely address their messages to the recipient's service and network address. MCI plans to post an on-line bulletin board explaining how to address messages to AT&T Mail customers, a spokeswoman said. AT&T said its on-line Help system will prompt users through the routine of addressing electronic messages to MCI or other E-mail providers.

The AIA plans to propose to E-mail providers that they establish a "directory mailbox," analogous to a telephone directory information number, York said. Users would request a directory listing from this address, which would then search a carrier's on-line directory and send back a listing of names and network addresses.

MANAGER'S JOURNAL

EXECUTIVE TRACK

Jack L. Burley has been appointed vice-president of the Logistics and Administration Division of **Heinz U.S.A.**, a division of H. J. Heinz Co. in Pittsburgh.

In his new position, Burley will assume responsibility for all Heinz U.S.A. logistics functions, including information systems, distribution and customer service, production planning and inventory control and purchasing.

He will continue to supervise the company's administrative functions, which include personnel administration, labor relations and communications. He was formerly vice-president of the Finance and Administration Division.

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Joanne R. Euster was appointed vice-president of information services at **Rutgers, the State University of New Jersey**, in New Brunswick, N.J. She retained her previous position as university librarian, which she has held since 1986.

She was previously library director at San Francisco State University.

Peter S. Graham was named associate vice-president of information services at Rutgers and continues as associate university librarian of technical and automated services.

Graham joined Rutgers in 1987 from the Columbia University libraries in New York. He was previously a systems officer at the Indiana University libraries from 1979 to 1981.

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Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo to or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Open doors in Silicon Valley

Intel's Ellis believes an accessible administration yields the greatest results

BY JEAN S. BOZMAN
CW STAFF

PROFILE: Carlene Ellis

CINDY CHARLES

Position: *Vice-president of corporate administration, Intel Corp.*
Mission: *Leveraging information resources to help Intel compete in a global market*

Carlene Ellis might be expected to have a corner office, complete with potted palms and a phalanx of support personnel. Instead, Intel Corp.'s vice-president of corporate administration works in a pastel-colored cubicle among dozens of identical cubicles in Intel's Santa Clara, Calif. corporate headquarters. The view? She commands a vista of the parking-lot basketball court.

Yet Ellis, who has worked at the Silicon Valley semiconductor maker since 1980, would not have it any other way. Her interest in being close to her staff reflects a belief that the communications lines to top management need to be open — all the time.

"I like a formal planning process, but I get more information out of informal meetings," Ellis says over a quick breakfast in the company cafeteria. "I'm a believer in continuous planning. Change is constant in our business, and you can't run it on autopilot."

That, Ellis says, would be a fatal mistake. "I absolutely would not want to do a plan and put it up on a shelf," she says. "That would mean catching up in big buckets at review time." Anticipating Intel's internal computer needs on a quarterly basis exemplifies the continuous planning process. "We're always asking whether we have everything we need, and we try to stay on top of that every three to six months," she says.

Ellis' responsibilities include information systems operations, which she ran at Intel in 1987 and 1988, but extend to the broader realms of purchasing, personnel and facilities planning. Her wider responsibilities have not made her any less mindful of the key role of IS in any modern corporation.

"I tell our customers, who are our end-users, that they can go outside Intel for any of the IS services we provide," Ellis says. "If we're competitive, they'll use our services. And most of the time, they do."

Ellis, 42, has always worked hard at providing the best performance. As a youngster in Jacksonville, Fla., she worked hard at becoming a ballerina — and danced with the Jacksonville city ballet. She credits her family with teaching her that perseverance would lead to high levels of achievement. "My parents raised me to believe that I

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Outsourcing snowballs in corporate world

BY ROBERT MORAN
CW STAFF

The information services arm of cost-conscious Fortune 500 corporations may need to be broken and reset in the next three years to meet the changing needs of the corporate body.

At a recent briefing in New York, Howard Anderson, president of The Yankee Group, a Boston-based market research firm, predicted that by 1992, 20% of Fortune 500 companies will be outsourcing their computing and communications as a faster and less expensive means of developing and bringing products to market.

Anderson said that to date, about 2% of corporations have turned to outsourcing, but others will be pushed to it by a variety of factors. He cited corporate mandates to run lean and the fact that there is twice as much capacity as there is processing in the industry.

"In the securities industry, the bull market started in 1982 and drove the growth in the number of people, computers and equipment in the infrastructure," said DuWayne Peterson, executive vice-president of operations/systems and telecommunications at Merrill Lynch & Co.

"Now, we are trying to figure out how to cut back."

Those cutbacks will involve hard decisions about what is vital and what is less strategic to a firm. "You cannot abdicate the operating systems, data management, network control and financial decisions," Anderson said. However, firms will farm out their data centers and some of their telecommunications.

Earlier this year, Merrill Lynch, for example, turned over much of its telecommunications to MCI Communications Corp. but did not relinquish network control.

Nor can IS directors close their eyes. According to Raymond Perry, vice-president of information services at Avon Products, Inc., organizations should approach the entire process with disengagement in mind and remember that the contract is everything.

"It's a road that, once begun, is very difficult to turn back from," Perry said. "Like it or not, you are probably in it for the long term."

Open doors

CONTINUED FROM PAGE 59

could do whatever I wanted to do — that I only had to figure out how to do it," she says.

As a student at the University of Georgia, Ellis trained her attention on mathematics and statistics and went on for a masters' degree there. She taught herself how to program in Cobol, "reading the manual straight through, because I knew I had to master that skill to be a systems analyst," she recalls.

After a stint programming Burroughs Corp. machines in Florida, Ellis moved to the Silicon Valley in 1976 and talked her way into a job at Fairchild Instruments, Inc. She joined Intel in 1980, where she moved into customer service and IS.

In her current position, Ellis manages IS, facilities, purchasing and human resources. She shares management responsibilities with Robert W. Reed, Intel's chief financial officer, under Intel's unusual "two-in-a-box" management structure. By sharing responsibilities, one Intel executive can spell the other when necessary. The structure grew out of a management-flattening initiative years ago.

Ellis never left IS behind when she moved into corporate administration in 1988, says Neal Franking, Intel's director of corporate information services, who reports to Ellis. Instead, she built on her experience in IS to leverage information resources into Intel's overall strategic business plan.

"Carlene likes to look at everything from a global perspective first," Franking says. "She encourages teamwork and employee involvement, engaging the organization from top to bottom in the decision-making process. Hers is a holistic view, so she's not looking at MIS issues as being separate from Intel issues."

In fact, IS is a critical element of Intel's business strategy. As a vendor of hardware components and supplier to many of the world's largest computer manufacturers, Intel becomes, at times, a living laboratory of mixed-vendor environments. "We stretch the capabilities of any vendor's product, from the communications bandwidth to computing engine cycles, from its operating systems to its applications," Ellis says.

Living laboratory or not, Intel faces the same challenges of any other Fortune 500 company — staying competitive in the rapidly changing global marketplace. To minimize the effects of distance between its design centers in California, Europe, Asia and Israel, Intel has built up a global backbone network that its 12,000 "knowledge workers" — including chip designers, managers and planners — can tap for vital corporate information. Accessing information through a consistent interface, these staffers work on 10,000 personal computers and thousands more engineering workstations.

In the final analysis, Intel must prove the usefulness of its technology on a global basis, Ellis says. "Right now, Intel and other American semiconductor manufacturers are competing in a global battle over chip technology. But that's not where the competition ends. It's about our software techniques and our standards. It's about our inventive use of technology. I think we've got to understand that our American technology is more than just an asset — it's our national treasure."

Getting together

For Carlene Ellis, one key task is managing vendor relationships, even if it means putting IBM and Digital Equipment Corp. salesmen in the same room.

As a chip vendor that uses systems based on its own products in a complex computer environment, Intel must put compatibility first. "I want our suppliers to be right in the middle of our problems," Ellis says.

Intel's internal information systems architecture is a three-tiered system of mainframes, minicomputers and personal computers. All of Intel's 10,000 desktop systems worldwide are based on Intel chips, and the selected operating system for newly installed IBM Personal System/2s is OS/2.

However, the engineering platforms present a mixed environment. While many workstations run IBM's AIX Unix operating system, some mainframes run Amdahl Corp.'s UTS Unix operating system. In the middle of the technology "pyramid," as Ellis calls the three-tier architecture, are DEC VAXs, Microvaxes and Vaxclusters. There are also a number of minicomputers and servers based on Intel chips, although many of these are no longer sold to the general public under the Intel label.

In the future, there will be a tighter linkage of the desktop PS/2s and PCs with the IBM mainframe, Ellis predicts. "A PS/2 could run a factory, given the right amount of memory and the right software," she says. That PS/2 — it goes without saying — will be powered by one or more Intel microprocessors.

JEAN S. BOZMAN

CALENDAR

"The Communications Networks '90 Conference and Exposition" will be held Feb. 5-8 in Washington, D.C. The conference and tutorial programs will examine issues such as multivendor network management, electronic data interchange, Integrated Services Digital Network, Open Systems Interconnect architecture and technology, Systems Network Architecture technology and products, high-definition television, security, deregulation, network planning and design, IBM/DEC connectivity, T1 and T3 networks and disaster prevention.

For more information, contact Dorothy Ferriter, IDG Conference Management Group, Framingham, Mass., (800) 225-4698.

JAN. 8-14

ATE & Instrumentation West Conference. Anaheim, Calif., Jan. 8-11 — Contact: MG Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

Developing Procedures, Policies and Documentation Seminar. Atlanta, Jan. 9-12 — Contact: Information Mapping, Inc., 303 Wyman St., Waltham, Mass. 02154.

CD-ROM: The New Media of the 1990s. Seattle, Jan. 10 — Contact: Interactive Institute, 557 Roy St., Seattle, Wash. 98109

PC/Desktop Printing: Expectations & Reality. Monterey, Calif., Jan. 10-12 — Contact: BIS CAP International, One Longwater Circle, Norwell, Mass. 02061.

Pacific Telecommunications Council's 12th Annual Conference. Honolulu, Jan. 14-17 — Contact: PTC '90, Suite 308, 1110 University Ave., Honolulu, Hawaii 96826.

JAN. 15-21

Technical Conference on the X Window System. Boston, Jan. 15-17 — Contact: MIT X Consortium, Room 217, Laboratory for Computer Science, 545 Technology Sq., Cambridge, Mass. 02139

Computer Graphics Show. New York, Jan. 16-18 — Contact: Computer Graphics Show, No. 409, 817 Silver Spring Ave., Silver Spring, Md. 20910.

Service and Quality Performance Conference. St. Louis, Jan. 17-18 — Contact: Washington University, Campus Box 1220, One Brookings Drive, St. Louis, Mo. 63130.

Strategies for Developing High-Performance Documentation. White Plains, N.Y., Jan. 17-19 — Contact: Information Mapping, Inc., 303 Wyman St., Waltham, Mass. 02154.

Superconductor Applications Global '90 Convention. Long Beach, Calif., Jan. 17-19 — Contact: Superconductor Applications Association, 24781 Camino Villa Ave., El Toro, Calif. 92630.

Network Security in the Federal Government Seminars. Washington, D.C., Jan. 18-19 — Contact: Infoland Seminars, Attn: Network Security Division, P.O. Box 162323, Austin, Texas 78716.

Software Support Conference. San Francisco, Jan. 18-19 — Contact: Conference Administrator, Institute for International Research, 6th Floor, 331 Madison Ave., New York, N.Y. 10017.

JAN. 22-28

Building an Effective Standards Program. Orlando, Fla., Jan. 22-24 — Contact: Quality Assurance Institute, Suite 350, 7575 Dr. Phillips Blvd., Orlando, Fla. 32819.

Improving Productivity in EDP System Development. Mesa, Ariz., Jan. 22-26 — Contact: Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

Conference for Information Processing Executives. New York, Jan. 23 — Contact: Kathy Collins, International Data Corp., P.O. Box 9015, Framingham, Mass. 01701.

Infotext '90. Las Vegas, Jan. 23-24 — Contact: Infotext Publishing, Suite 309, 347000 Coast Highway, Capistrano Beach, Calif. 92624.

PCB Expo '90. Ft. Lauderdale, Fla., Jan. 23-25 — Contact: PMSI, 1790 Hembree Rd., Alpharetta, Ga. 30201.

Uniforum 1990 Conference of Unix Systems Users. Washington, D.C., Jan. 23-25 — Contact: Uniforum, Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

Macuser Marketing Conference. San Francisco, Jan. 25-26 — Contact: Macuser, 18th floor, 950 Tower Lane, Foster City, Calif. 94404

Personal Computing Forum. Into the Seismic Decade: Standards and Earthquakes. Tucson, Ariz., Jan. 28-31 — Contact: Release 1.0, Edventure Holdings, Inc., 375 Park Ave., New York, N.Y. 10152.

JAN. 29-FEB. 5

An Overview of Information Engineering. Washington, D.C., Jan. 29 — Contact: James Martin Associates, Suite 200, 1850 Centennial Park Drive, Reston, Va. 22091.

VAX/VMS Performance Management. Tampa, Fla., Jan. 29-31 — Contact: Ranco Software, Inc., Suite 200, 2110 Research Blvd., Rockville, Md. 20850

Executive Forum on Software Futures. San Francisco, Jan. 30-31 — Contact: Digital Consulting, Inc., 6 Windsor St., Andover, Mass. 01810.

Developing Ada Systems. Los Angeles, Jan. 31-Feb. 2 — Contact: TTC Seminars, Dept. DAS, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510.

Association for Educational Communications and Technology. Anaheim, Calif., Jan. 31-Feb. 4 — Contact: Association for Educational Communications & Technology, 1126 16th St., N.W., Washington, D.C. 20036.

Infocomm International. Anaheim, Calif., Feb. 1-3 — Contact: The International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

Telecom '90. Orlando, Fla., Feb. 4-7 — Contact: American Bankers Association, 1120 Connecticut Ave., N.W., Washington, D.C. 20036.

FEB. 6-12

Midrange Vendor Conference. Anaheim, Calif., Feb. 10-11 — Contact: National Productions, Inc., 27 Congress St., Salem, Mass. 01970.

FEB. 13-19

National Conference on Software Development. Washington, D.C., Feb. 13-15 — Contact: Conference Manager, U.S. Professional Development, Suite 200, 1734 Elton Road, Silver Spring, Md. 20903.

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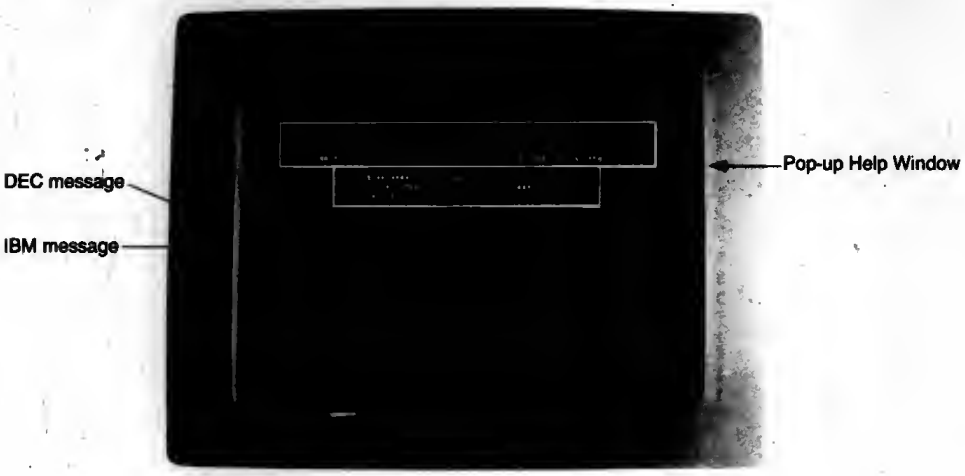

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INDUSTRY INSIGHT

Nell Margolis

Power play phobia

Frank Wright is worried about the power play we're making in the Soviet Union. Not the U.S.; *us*, the computer industry.

And not military power, but computing power.

"If I could get one message across to the industry," said Wright, who is the chief executive officer of a small company that is already doing business in the USSR and hopes to do a lot more, "it would be this: Let's not make the same mistakes there that we've made here."

One of the worst mistakes we've made here, he said, is indoctrinating users with the lust for power: costly chips and MIPS that their computing needs do not demand and cannot use.

Unlikely in a communist culture? Think again, Wright said, recently returned from the USSR. Soviet users-to-be whose business needs could be met by a personal computer that was state of the art several years ago, he lamented, are convinced — by American advertising and a mounting tide of peer pressure — that they will not be respected unless their desks boast a cutting-edge workstation. "Don't kid yourself," Wright said.

Continued on page 64

Pansophic managers split up

BY ELLIS BOOKER
CW STAFF

LISLE, Ill. — Pansophic Systems, Inc. President, Chief Operating Officer and Director William G. Nelson submitted his resignation, effective Jan. 31, earlier this month. Nelson cited differences of management philosophy with Pansophic Chairman and Chief Executive Officer David J. Eskra.

Nelson, 55, joined the IBM software house in August 1983 from Chase Econometrics/Interactive Data Corp. in Waltham, Mass., where he was a senior vice-president of marketing and field operations.

The announcement was a surprise, said a company source, who said Nelson and Eskra had worked together well in the past, taking Pansophic from a $40 million business to a more than $200 million corporation today.

While unexpected, Nelson's departure points to the trouble that Pansophic has faced in struggling to meet Wall Street's expectations during the past few years, according to Mark Finley, a software and services analyst at Soundview Financial Group, Inc. in Stamford, Conn.

"They have underdelivered or overpromised over the last three years," said Finley, who noted that the last two quarters were the only "two good ones, back-to-back, in two years."

Nelson *to depart firm*

The consolidation of Nelson's operational function in Eskra, Finley continued, was somewhat warranted. "The way the business has been operating, they didn't need a Mr. Inside and a Mr. Outside."

In a statement, Pansophic said Eskra, 48, will assume the duties of president.

Pansophic was founded in 1969 and produces software that includes applications for IBM's System/36, 38 and Application System/400, as well as the Telon mainframe code generator.

IBM Japan cultivates retirement pastures

BY YASUKO YOSHIMI
SPECIAL TO CW

TOKYO — The same IBM that is urging early retirement on its U.S.-based employees earlier this month acted to help workers in Japan avoid that alternative.

In a joint move with its employees who are reaching the retirement age of 60, IBM Japan Ltd. will establish two new companies in February, IBM Japan announced this week. The companies are aimed at coping with Japan's increasingly aging society by providing a better working environment for those eager to keep working after retirement.

The first company, International Consultation and Education Services Co. Ltd., will provide employee training and consultation services focused on strategic information systems. It is capitalized, with 65% of the amount financed by its executives and the remaining 35% will be covered by IBM Japan. The company will initially start out with 13 employees and expects to earn $13.99 million in sales and employ 80 people in five years.

The second firm, International Maintenance Services Co. Ltd. (IMAS), will also be started with funds provided 65% by executives and 35% by IBM Japan — and will provide maintenance services for IBM Personal Computers. IMAS will start with a staff of 33 people and plans to employ 60 workers and have sales of $13.99 million by 1995.

One company's justice is another's injustice

Lawsuit against Justice Department upheld

BY NELL MARGOLIS
CW STAFF

A federal district court recently upheld a ruling in support of Inslaw, Inc., a software company with good reason to complain that there is no justice — and to wish there were no Justice Department.

In a 44-page memorandum, Senior U.S. District Judge William Bryant drew the same conclusion that the U.S. Bankruptcy Court arrived at two years ago: that the U.S. Department of Justice "took, converted and stole" Inslaw's litigation management software product and drove the company into bankruptcy.

The details of the business and litigious dealings — and, according to one plaintiff and two judges, the double dealings — between Washington, D.C.-based Inslaw and the Justice Department are Byzantine. However, according to the Bankruptcy Court in 1987 and the appeals court last month, Justice got the software and Inslaw got the shaft. Under the guidance of several Justice Department employees, including one who had left his former job with Inslaw under unhappy circumstances, the department acted "willfully and fraudulently" to appropriate Inslaw's software, Bryant ruled.

In addition, he said, the department wrongfully tried to turn the company's attempt to reorganize under the bankruptcy laws into a liquidation.

Working day and night to make a better PC fax board

BY SALLY CUSACK
CW STAFF

Working 12 to 17 hours a day, seven days a week, has not paid off for Suzanne Maisner — not yet.

Gambling on the growth of the personal computer facsimile market, Maisner and her partner, Ken Hilliard, created Share Communications, Inc. about 12 months ago. Their aim: to make and market a board that could convert an IBM-compatible PC on a local-area network into a personal facsimile machine.

Without a visible track record to trade on, the partners found venture capitalists reluctant to invest; all research, development, sales and marketing to date have been done entirely out-of-pocket. The company, based in Seattle, currently has four employees and no formal payroll.

Beating the odds

Despite these inauspicious beginnings, the product, Faxshare, was released in November. According to analysts, it entered a growing market.

BIS CAP International, Inc., a research firm located in Norwell, Mass., estimated that there will be 142,400 fax board placements in 1990, up from 73,610 placed units in 1989. Forecasts predict 405,680 installations by 1993.

The Share staff meets over pizza and beer once a week for progress reports and news updates.

Maisner *is responsible for product management*

"We all work desperate hours here," Maisner said. "Everyone works weekends, nights and sometimes from their homes."

"Because we don't have deep pockets, we know that we have to do everything right the first time," Maisner explained. "There is no margin for error. Our working philosophy is that we only get one chance for everything we do."

In addition to Share Communications, both Maisner and Hilliard hold down full-time jobs: she in manufacturer's representation, he in consulting. Maisner says that money would make life infinitely easier. For starters, it would let the company hire engineers to work on a daily basis instead of squeezing in nights and weekends. As president, Maisner is solely responsible for all of the company's management functions, including marketing, sales, administration and all organizational activities.

"Right now, my files are a mess," she said. "I don't have the time to train a temp to do them for me, providing I can even afford to hire a temp on a given month."

What life at Share lacks in ease, it makes up for in activity. Faxshare is currently distributed through value-added resellers, value-added distributors and systems integrators; the firm is currently contemplating using distributors and direct sales as well.

A Faxshare version tailored to run under Novell, Inc.'s Netware for Intel Corp. 80386-based platforms, which is due out in early 1990, is in the works, Maisner said. She also sees some OEM potential in the product.

"We have more opportunities than [we have] the ability to respond to them," Maisner said.

Margolis

FROM PAGE 63

"The 'must-have' mentality is already taking root over there."

Sure, this could be a guy with an axe to grind: He heads up a company that makes microcomputers, and its name isn't Compaq or Sun. But his concerns extend well beyond his own firm's bottom line. The sudden and unexpected prospect of huge technology markets in the Eastern Bloc countries is a gift of boundless potential for an industry that has lately appeared mired in layoffs, excuses and insecurities. This is a new frontier: not a figure of speech, but the real thing.

How foolish it would be to despoil it, rather than exploit it. An overwhelming number of the sad stories that recently have been hogging computer industry headlines are variations on the same theme: Boomtown enthusiasm over jazzy new technology leads market research folks to spin off pie-in-the-sky estimates of exponentially expanding markets; vendors believe it, and churn out the gizmos accordingly; vendors and market researchers convince customers that they've gotta have one; customers get one.

Months later, when a) few know how to use it; b) few know when to use it; c) few know why they should use it; or d) all of the above, frustration roils, heads roll, funds stop, stocks drop, layoffs start, takeovers mount and, brother, here we go again: Welcome to the umpteenth End of the Industry.

For the past year, one company after another has been professing that it's learned to avoid this vicious spiral: that it is marching into the '90s with a laser-like focus on the customer's real needs. The opening of the Eastern front presents a grand opportunity for all of them to prove that they mean it.

Margolis is *Computerworld's* senior editor, industry.

IN BRIEF

Stepping in

Motorola, Inc. last week reorganized its expanded training and education center to create Motorola University. The company, which over the past three years has spent an estimated $150 million on employee education in areas ranging from elementary math to sophisticated engineering, plans to tighten relations with community schools in its effort to establish itself as a standard-bearer of corporate education.

Stepping out

Scotts Valley, Calif.-based microcomputer software maker Borland International last week made its debut in the U.S. public market. The initial public offering of 2,252,000 shares of Borland common stock at $10 per share was underwritten by Goldman, Sachs & Co. and Alex Brown & Sons, Inc.

Stepping up

Aiming at broadened access to international markets and a diversified shareholder base, on-line transaction processing player Stratus Computer, Inc. listed its stock on the New York Stock Exchange last week.

Tidings of comfort and joy

San Francisco-based technology venture capital firm Accel Partners earlier this month announced the closing of a new $100 million fund. The new kitty, dubbed Accel III, will target companies that feature proprietary technology, proven track records and sound management teams, according to the company.

COMPUTER CAREERS

Welcome to the new decade

For IS executives, the game remains unchanged: Survival of the fittest

BY DAVID A. LUDLUM
CW STAFF

The outlook for information systems executives changing jobs in 1990 can be summed up in one word: competition.

First, the pace of corporate competition will continue to be intense. The maneuvering will mean more personnel cutbacks and therefore stiff competition among job seekers.

Top IS executives could be among those losing their jobs as cost-concious companies target IS budgets for cuts. However, corporate rivalry could mean more heated competition for the best and brightest IS executives, especially for the ones who are great communicators.

In general, IS careers will not get much help from the U.S. economy in 1990, which is expected to show anemic growth. In fact, if you are looking for a hot industry, you might consider the outplacement business. Executives of outplacement firms, which help companies find new jobs for laid-off workers, say they have plenty of work and do not expect things to change soon.

"I'm getting more people with less demand for them than I've ever seen," says Jim Challenger, president of New York-based outplacement firm Challenger, Gray & Christmas. Firms are not expanding or even replacing their managers as readily, and people looking for work are taking longer to find it, Challenger says.

The reason is the stiff corporate competition, which has fostered a demand for quick results. The demand can hit IS organizations particularly hard because their work usually does not show up quickly on the bottom line.

The upshot is that companies are replacing IS executives who are theoretical thinkers as well as the seat-of-the-pants people without a broad enough outlook, Challenger says. What they want are managers who can produce systems that generate a quick payoff. "People want money today," Challenger says. "What they're buying is someone interested in solving the user's problem now. The thinkers are being replaced with the doers."

The time frame is particularly short in the financial services industry because of changing needs and repeated layoffs, according to Norm Sanders, managing director at executive recruiting company Russell Reynolds Associates.

"Hardly anyone can even envision investing in a system that will take more than six months to develop," he says.

At the Burlington, Mass., office of outplacement firm Drake Beam Morin, Inc., Kris Girrell, vice-president of marketing and development, says there are more IS managers to place than there have been in the last four or five years. Most of them are victims of layoffs, although others were let go because of "poor fit or poor chemistry."

The competition among these job hunters means they must differentiate themselves. "It's not enough to say you have 10, 15 or 20 years of experience. That's what everybody out there has," Girrell says.

Job-hunting IS managers can differentiate themselves in three ways. One is through personality. Another is the skills possessed in addition to the ubiquitous ones. The third element is the ability to communicate these talents.

"You and I can have the same skill set, but if I can articulate it to an employer better — if I can convey how it will benefit the bottom line of that company — I'll end up with the job and you won't," Girrell says.

Girrell sees more of the same tough competition among job hunters as corporate scrutiny of IS groups continues.

Few, if any, industries are expected to surpass the minimal growth projected for the U.S. economy in 1990. The Conference Board, a New York-based business group, projects that the U.S. gross national product will grow about 1% in 1990.

> "PEOPLE WANT MORE MONEY today. What they're buying is someone interested in solving the user's problem now."
>
> JIM CHALLENGER
> CHALLENGER, GRAY & CHRISTMAS

Hardest hit by the slowdown will be capital-intensive manufacturers and the firms that supply them with computers, machinery and other capital equipment, says Steven Malin, a senior economist at The Conference Board.

Regardless of their economic condition, hiring of IS executives should be relatively strong in retailing and manufacturing of consumer goods, Sanders says. Both industries have lagged in their investment in information technology. Now, retailers are under pressure to use information technology to cut costs and identify the products that customers want the most. Investments by retailers will prompt similar moves by the consumer goods makers they buy from.

While the economy suggests fewer jobs will be available for IS executives, the need for outstanding people will continue to grow, says Skip Tolette, a partner at New York executive search firm Schmitt Bishop Tolette. Despite highly visible personnel cutbacks at companies such as AT&T, IBM and Wall Street brokerages, the need for information technology leadership means there is a continuing need for the outstanding people, Tollete says.

Mergers can eliminate positions for top IS executives, but they can also create them, Tollette says. Someone new would be brought in when neither of the incumbents is considered to be "the strategy person" needed to run systems for the merged firm.

Much of the hiring of IS executives will be prompted by decentralization of systems as different profit centers create their own support staffs, thus putting a premium on IS managers who are good at responding to user needs, Sanders says.

Ludlum is a *Computerworld* senior writer.

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   - 31 Mgrs., Supvr. of Programming, Software Dev.
   - 32 Programmers, Software Developers

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   - 12 Vice President, Asst. VP
   - 13 Treasurer, Controller, Financial Officer
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   - 51 Sales & Mktg. Management

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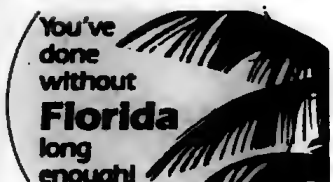

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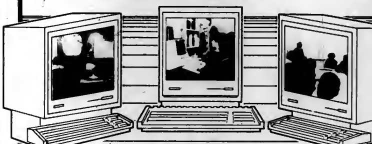

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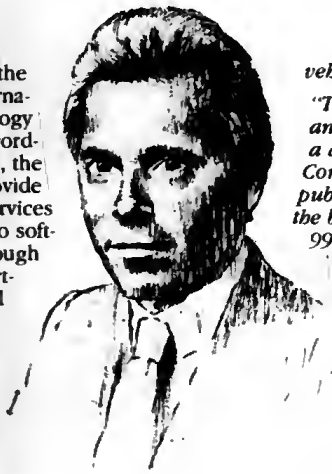

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MARKETPLACE

IBM enters era of enterprise

The computer giant's strategy for the 1990s will integrate architectures

BY BRIAN JEFFERY
SPECIAL TO CW

IBM's strategy for the 1990s focuses on its key base of large end-user, or "enterprise," customers. The company will continue to address small and medium-size businesses through its Application System/400, Personal System/2 and, starting in 1990, its low-end AIX systems.

IBM also preserves some interest in commodity personal computers. However, the vast majority of its resources are targeting the 5,000 or so corporate and government mainframe users who generate more than 77% of its revenue and a larger proportion of its profit.

Clearly, IBM's long-range objective is to expand into a broad-based supplier of any and all information products and services to this customer group. This shift was evident in 1989 when IBM restructured its sales force pay by basing it on total account revenue rather than product sales. IBM's large-scale expansion of its maintenance, systems engineering, professional services and systems integration activities since 1985 is largely geared toward developing more substantial, in-depth service-based relationships with end users at large firms. The facilities management business, which IBM entered in July with Eastman Kodak Co. as its first major customer, is also a major target.

The IBM enterprise strategy is, however, considerably broader and more sophisticated than just a marketing and services exercise. With the firm's Officevision, AD/Cycle and CIM Advantage announcements in 1989, IBM began a subtle shift in its Systems Application Architecture strategy toward integrated, interdependent software environments covering a wide range of computing and communications in an enterprise context.

SAA, however, is not the whole picture; rather, it should be considered the software component of a much broader IBM plan for integrated enterprise architectures. For example, IBM has already indicated that its Enterprise Systems Architecture (ESA) will evolve from the large 3090 environment to become a distributed architecture implemented not only in the data center but also in midrange systems, communications and the PS/2 line. IBM's statement that the ultimate goal of SAA is to create the "enterprise single-system image" refers to this broader implementation of ESA.

Enterprise architecture, in the IBM definition, also extends beyond SAA to include such environments as AIX, its Unix variant, and IBM Open Systems Interconnect (OSI) networking. The way IBM is moving with them is to embed in them the same underlying architectures that exist in SAA.

> IBM's STRATEGY is not to survive, or even to succeed: It is to win.

In 1990, for example, IBM will incorporate the SAA relational database management system architecture, LU6.2-based cooperative processing and many SAA programming and interface standards into AIX. OSI already supports the key backbone features of IBM's Systems Network Architecture communications and network management, even if it employs different interfaces, protocols and conventions.

AIX will move off the sidelines in 1990 to become a central, interoperable component of the IBM enterprise environment — a transition that can be expected to make AIX attractive to IBM's large end-user base and substantially reinforce its prospects as an industry Unix standard.

Common software architectures will be paralleled by major changes in hardware. The use of IBM's Micro Channel Architecture (MCA) began in 1987 with the PS/2. In 1990, it will move to IBM's new reduced instruction set computing systems, and it will not stop there. The next generation of AS/400 and 370 midrange systems will be MCA-based; by the mid-1990s, IBM's large mainframe systems will move to this platform.

IBM is a cautious company and is not taking any chances on whether the marketplace will accept its moves. Using a combination of marketing tie-ups, development agreements, "soft" loans and equity investments, IBM is pushing much of the third-party software and services community to convert software to IBM standards. More than $600 million went into this exercise in 1989. In 1990, it will probably top $1 billion.

The computer industry has never seen anything like this effort. Rather than letting third-party support develop under its own momentum, IBM is seeking to accelerate migration by collapsing transitions that once may have taken decades into a much shorter cycle.

In the final analysis, IBM's strategy is not to survive, or even to succeed: It is to win. IBM management has made it clear that Wall Street's beloved earnings stream is not that high on the corporate priority list. It has done so chiefly through its no-layoff policy and its continued heavy investments in research and development as well as capital and personnel at a time when its financial weaknesses are far from cured.

Whether IBM will realize its objectives is open to dispute. The seriousness with which it is pursuing them, however, is beyond any doubt.

Jeffery is managing director of International Technology Group in Los Altos, Calif.

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The BoCoEx index on used computers

Closing prices report for the week ending December 15, 1989

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PS/2 Model 60	$2,700	$3,100	$2,500
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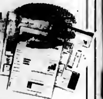

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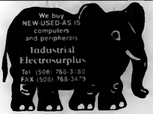

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How to forecast training

It can be done only by structured communication with other managers

BY BILL SEBRELL
SPECIAL TO CW

Training managers worth their salt struggle to plan their course offerings so that the right students take the right courses at the right time. However, trying to do so inevitably creates frustration during the annual corporate planning and budgeting process, because forecasting one's training needs can be a haphazard game.

There are reasons for this situation. First, managers often put together their budgets before they are sure what they will be doing in the coming year. Second, the technical education department prepares its budget at the same time as the rest of the information systems organization. As a result, the education people do not know what activities will be approved or even what some of the other units plan to do. They then put together detailed training forecasts in November and December, when everyone has a clearer view of the coming year — but after the budgets have been completed.

Along with their sizable spending, IS training departments now have professional managers rather than training coordinators, as well as a curriculum with sequences of courses, quality control and a variety of other management mechanisms.

Unfortunately for the training manager, however, control over who goes to what class and when they go is still left to the students' supervisors. It is only through direct contact with these people that the training manager can do any forecasting.

In some organizations, the process of finding out what training will or will not be provided is misnamed needs analysis. In other firms, it is called the requirements process. Still others dub it the training forecast. The bottom line is that there has to be a structured method of asking the supervisors how much training they want in the coming year and when they need it.

A proven technique is to develop a formal questionnaire — perhaps an electronic one. This document should list the courses that are currently available and the new courses that are to be introduced in the coming year. Respondents can also enter the names of courses that they think should be added to the list. Across the top of the page are the months. Under each month, there should be three columns to indicate high, medium and low levels of need.

This form can be sent to each supervisor, who will indicate how many students require training in a particular subject under the desired month at each level of need. A summary of these numbers will give the training manager a fairly accurate estimate of the load, timing and priority of the training expected during the coming year. Relating these numbers back to the budget will allow the training manager, in conjunction with the senior managers in IS, to make some decisions about what will and will not be offered and the optimal timing of selected offerings.

The courses that are entered on the blank lines give the training manager insight into how quickly new technologies are moving into the firm. They also might indicate other issues that be should address.

Nontechnical-corporate training courses can also be included in the questionnaire. Information on the anticipated load for them can be passed along to the other training managers for their forecasts.

If the forecasting system is automated and the supervisors are required to enter student names rather than numbers, there is no reason not to link this data to a scheduling system. Based on the level of need and the requested timing, courses can be scheduled and students automatically enrolled. Obviously, this information has to be adjusted on a regular basis, but it produces a framework for the year's schedule.

As a general rule, experience has shown that the numbers collected in this fashion are about 80% accurate. The timing indicated is not nearly that reliable, although the supervisors tend to get the numbers in the right quarter. They are usually very accurate for the first quarter, which they can foresee best.

One means of improving the accuracy is to arrange for the supervisors to be evaluated during their performance appraisals on the basis of the accuracy of their forecasts. Another possibility is to impose charges for the requested training to discourage requests from exceeding actual needs. With these two methods, the accuracy can rise above the 80% norm very quickly.

Getting this type of forecasting to work takes time and effort. It is vital to develop and maintain accurate records based on each person's job and career path. As we become more sophisticated, these records can detail what courses have been offered to employees, and we can map the courses against a curriculum.

With this approach, training can be predicted even more accurately, and forecasting can move to a higher level of automation. The management of training and development of new products can become more systematic. Corporations will be better able to predict the costs and benefits of training and respond to market conditions.

Sebrell is a vice-president at Data Base Management, Inc., a subsidiary of American Management Systems, Inc. in Manchester, Conn.

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NEWS SHORTS

It's a Dun deal

The Dun & Bradstreet Corp. has cleared the biggest hurdle it has faced in its acquisition of Management Science America, Inc. D&B said it has acquired approximately 90% of the outstanding MSA stock, enough to proceed with plans to merge MSA with its McCormack & Dodge subsidiary in early January.

Apple settles patent suit

Apple Computer, Inc. has settled a software patent dispute with Hyperacks, Inc. and Quickview Systems, Inc. with a cross-licensing swap that gives patent rights to Apple and technology access to the two smaller firms. In September, Hyperacks alleged that Apple's Hypercard electronic file-card system infringed on a patent held by the Los Altos, Calif.-based companies. The settlement grants Hyperacks the rights to certain Apple technologies and gives Apple, its customers, distributors and developers a license to the two Hyperacks patents.

AT&T wins federal office contract

AT&T won a major government contract, worth up to $850 million, for office automation systems at the U.S. Department of Transportation. AT&T will provide up to 40,000 Unix desktop computers, the Starlan local-area network system and systems integration services under the contract, which runs for three years with five one-year options for renewal. The first stage of the contract guarantees AT&T a minimum of $18 million in sales.

Data General rings up record sale

Data General Corp. last week reported its largest Aviion sale to date, sealing a seven-year, $127-million contract with the U.S. Department of the Interior's Water Resources Division for more than 6,000 Aviion workstations and servers. Installation is slated for completion within four years.

Covia spins off software unit

Hoping to leverage its experience building the massive Apollo on-line reservation system for United Airlines, Covia Corp. last week formed an independent software unit, Covia Distributed Software, Inc. The company will develop high-performance, multivendor software subsystems for a spectrum of industries.

AT&T adds options

An extended version of AT&T's Bandwidth Management Service announced last week reportedly allows users to reconfigure Accunet T1.5 Service bandwidth all the way to equipment on their own sites, instead of just between AT&T central offices, as before. AT&T also announced that its Accunet Spectrum of digital services will now route 9.6K bit/sec. circuits, at the same cost as a 64K bit/sec. circuits.

Netmaster developer acquired

Australian-based developer Software Developments International (SDI) Pty Ltd. has agreed to sell its outstanding stock to Reston, Va.-based Systems Center, Inc. for $43 million. SDI's Net/Master network control package is used in 1,700 sites. In 1984, Cincom Systems, Inc. bought worldwide licensing rights to the product, but Systems Center said it is negotiating to acquire these rights from Cincom.

Airlines cleared of bias

A federal jury in Los Angeles ruled that American Airlines and United Airlines were innocent of charges that they used their computer reservation systems (CRS) to steer ticket business in their favor, to the detriment of Northwest Airlines and other competitors who filed the antitrust suit. The American and United systems control about 70% of the CRS market.

IBM opts for a better mousetrap

BY RICHARD PASTORE
CW STAFF

In an extremely rare move, IBM has pulled the plug on one of its own software development projects and opted instead to endorse a third-party offering.

Last week, IBM scuttled its Office Interconnect Facility (OIF) software designed to allow IBM's Officevision products to communicate transparently with other vendors' office software systems. OIF, under development for more than a year, never quite made it out of the evaluation stage.

"We determined after lengthy testing that [OIF] wasn't going to meet our customers' needs in the time frame needed," an IBM spokesman said. "We wanted to get our customers a product in as timely a basis as possible."

IBM turned instead to Soft-Switch, Inc., a Wayne, Pa.-based vendor that specializes in cross-platform, electronic-mail communications software. IBM has agreed to sell Soft-Switch's current Officevision offerings and will co-develop additions to that line. Soft-Switch will sell the products as well and handle the installation and support duties.

Soft-Switch's current products enable MVS and VM-based systems running Officevision to communicate transparently with systems from firms such as Digital Equipment Corp., Wang Laboratories, Inc., Hewlett-Packard Co. and 3Com Corp.

Soft-Switch also plans to support IBM's Officevision/400 and will co-develop a version to support IBM's OS/2 Extended Edition-based Officevision/2. These versions are slated to debut in June and early 1991, respectively.

IBM watchers said the move is highly uncharacteristic. "For the first time I have witnessed, IBM has seen a better mousetrap in the marketplace than they were making and has decided to go with it," said Sam Albert, a 30-year IBM veteran and now an independent consultant based in Syracuse, N.Y.

An IBM spokesman acknowledged that he "could not recall" any similar action by the company.

IBM's decision to endorse an outsider and overlook the "not-invented-here" prejudice testifies to a "new, aggressive attitude," Albert said. "It reflects a willingness to try to get a product to the customer faster, even if it means going with somebody else," he said.

Ann Palermo, an analyst at Framingham, Mass.-based market research firm International Data Corp., said, "This [interconnectivity] had been a real missing link in the Officevision environment."

Dogged by a disappointing bottom line, IBM has little choice but to employ every means to expedite product rollouts. Recent shipment snafus, such as last year's infamous 3390 disk drive delay, have hurt the firm financially.

A number of analysts voiced concern that Soft-Switch, a 125-person company with an estimated $15 million to $20 million in revenue, will be hard-pressed to handle the surge in orders and support responsibilities that IBM's endorsement is likely to bring.

"It's something we have to manage carefully," said Donald Fisher, Soft-Switch vice-president of open systems marketing. "We have a program in place now that includes additional staff."

New PS/2

In a separate announcement last week, IBM finally introduced a native Intel Corp. 1486-based Personal System/2. However, observers said it is a bit anticlimactic since the new box is nothing more than a 486-equipped PS/2 Model 70.

The 486-based PS/2 Model 70 even costs the same as an Intel 80386-based Model 70 equipped with IBM's 486 upgrade board — $12,395 to $12,990, depending on disk drive capacity. The new machine is available immediately.

According to a spokesman, IBM will continue to offer the 486 board as an upgrade option for customers who chose the 386-based version.

'Just say no' book provokes thought, not flag-waving

BY ELLIS BOOKER
CW STAFF

The Japan That Can Say "No" contains much that hits the target in its criticisms of U.S. business practices and ought to provoke thoughtful analysis and debate rather than jingoism here, said a handful of U.S. readers who have managed to obtain unauthorized translations of the book.

A series of essays written by Sony Corp. Chairman Akio Morita and right-wing Diet member Shintaro Ishihara, the book, published in Japan this summer, is at times sharply critical of U.S. business policies and advocates an expanded international role for Japan as, its authors argue, it assumes the mantle of the world's financial and technological leader.

Those who have read the slim book — at least three unauthorized English translations are being circulated — said Morita's statements are startling only for their candor.

"His major point is that American management thinks 10 minutes ahead while Japanese management thinks 10 years ahead," said Mitchell Kertzman, chairman of American Electronics Association and chief executive officer at Computer Solutions, Inc., a software vendor in Burlington, Mass.

Kertzman noted that Morita is equally critical of some Japanese business practices, including barriers to free trade, a reluctance to hire American managers in the U.S. divisions of their companies and a negotiating stance that occasionally replaces frankness with politeness — thus the 'No' in the book's title.

More disturbing, said Kertzman and other readers, are Ishihara's strident views.

Ishihara, noting Japan's prowess in the semiconductor business, said at one point, "If Japan sold chips to the Soviet Union and stopped selling them to the United States, this would upset the entire military balance."

He then goes on to wonder why this "ace" has not been played out more forcefully in the realm of international relations.

Dissenting voice

However, Sheridan M. Tatsuno, president of Neoconcepts, a Far East trade consultancy based in Fremont, Calif., insisted that Ishihara is a "marginal voice" in Japan and should not be taken as representative of the country's basic attitude toward the U.S.

The true significance of the book, Tatsuno said, is that "Japan feels confident enough to speak what is on its mind." However, he said there is frustration in Japan over what it feels are mixed signals coming from the U.S.

"The U.S. has been pushing Japan for 10 years to take more [international] leadership," he said.

"But Americans aren't used to hearing Japan speak frankly."

Staff writer Richard Pastore contributed to this report.

Wang changes proprietary tune

BY MARYFRAN JOHNSON
CW STAFF

LOWELL, Mass. — In a dramatic shift away from proprietary systems, Wang Laboratories, Inc. last week unveiled its plans to enter the new decade with industry-standard hardware, software and communications products based on the Unix, DOS and OS/2 operating systems.

Customers and industry analysts seemed generally impressed and somewhat surprised by the scope of Wang's ambitions and its clearly stated plans. However, the words "long overdue" cropped up in all corners.

"We're changing the very way we do business," said Richard Miller, Wang's chief executive officer. "It's long overdue."

Yet, the news that Unix and industry standards are the future at Wang may still hit with a thud for some 50,000 VS users with years of investment in a closed hardware and software environment.

"We'll have to see how Wang matches up in actions to go with the words," said Hugh Naughton, information systems director at the Gas Research Institute in Chicago. "We have heavy investment in the VS architecture and software, so we were relieved that Wang made it quite clear they have no intention of abandoning us."

Allan Stern, MIS director for the city of Boston, said he saw no clear advantages for VS users in the switch to open systems.

"I think the general direction of the company is positive," Stern said. "But I also understand that when somebody says to me that they want to move me off of something, they're losing a commitment to it."

"We have as many questions as answers, but we're optimistic because we think Wang is a good company," Stern added.

Stern's 1,400 users rely exclusively on Wang products for office automation. Thus, if Wang can interconnect Unix versions of its office software with Stern's VS environment, "that is something I could see working," he said.

Wang officials stressed that VS customers will be migrated — not abandoned — through reengineered code and development will continue on the high end of the VS line.

However, Miller pointed out that Wang's research and development, budgeted in 1990 at \$250 million, will focus the bulk of its resources on the Open/Architecture products. Less than one-third of the R&D money is earmarked for high-end VS systems, he said.

Re-establishing itself as an innovator and holding its leadership position in the imaging market are especially important to Wang, Miller said.

"This is a strong and healthy shift for Wang," said Robert Cameron, an analyst at Dataquest, Inc.'s Boxboro, Mass., office. "What is most significant is that Wang has chosen as its server platform of preference something other than VS. I don't hear them de-emphasizing VS but emphasizing an alternative with OS/2 and Unix on the [286 family] Intel chip."

For users, the most popular part of Wang's Open/Architecture strategy may be its new willingness to form partnerships with other vendors.

"An awful lot of people with good products have found that Wang didn't have the most cooperative spirit in dealing with them," Naughton said. "That change is really for the better."

Analysts also praised the decisive way in which Wang finally bit the bullet. "There was a level of coherency and focus in this statement of direction that none of us have ever heard before from Wang," Cameron noted.

However, Donald Bellomy, an analyst at International Data Corp. in Framingham, Mass., cautioned that "many long-term questions remain" for Wang.

"It's a real gamble to know if they can do it all in a narrow window of time during the next year or so to establish the kind of identity they're attemping to craft," Bellomy said. The key will be "delivering on their promise" to move VS users quickly and painlessly to open platforms, he added.

At Hartford Insurance Group in Hartford, Conn. — one of Wang's largest customers — Jack Crawford is expecting Wang to do exactly that.

"I assume Wang will migrate all of the functional software that works with VS today to the Unix environment," said Crawford, Hartford's vice-president of information management. "As a customer, I need to be given time to continue with VS or to migrate to Unix."

Fork in the road

Although Wang has committed to further development of the VS minicomputer technology, it has shifted its priorities toward Unix and open systems

SOURCE: WANG LABORATORIES INC. CW CHART

Opening act

The introduction of a Unix-based server from Wang Laboratories, Inc. in late January will be the first product appearing under the company's new Open/Architecture strategy.

Other highlights include the following:

• A desktop platform based on Intel Corp.'s 80286, 386 or 486 microprocessor, with scalability and binary applications compatibility ranging from industry-standard IBM-compatible personal computers to large multiprocessing systems.

• Unix, DOS and OS/2 are tagged as the operating systems of choice for all except high-end minicomputer users, with Unix 1 and DOS products appearing in 1990 and OS/2 products farther down the road.

• At the client/server level, Wang VS minicomputers will be assigned the role of local-area network servers or multiuser hosts, initially running AT&T Unix System V. Development work in the VS will continue only for high-end systems.

• In networking, Wang announced a new partnership with Novell, Inc., under which Wang licenses Novell's Portable Netware to run on its midrange systems. The two companies also plan to market an Open/Image server that provides Netware users with access to Wang's imaging capabilities.

A 15-month-old partnership with Banyan, Inc. gives Banyan's Virtual Network Server special status with Wang, but the door is also opening for other networking protocols. Wang will use the Open Systems Interconnect standards for its own networks and for multivendor interoperability.

• Wang's proprietary Pace database management system will make room for other popular industry databases from vendors such as Oracle Corp., Software AG, Information Builders, Inc. and Gupta Technologies, Inc. The next generation of Pace will be compliant with industry-standard SQL.

MARYFRAN JOHNSON

IBM helps keep U.S. Memories from fading

BY NELL MARGOLIS
CW STAFF

NEW YORK — Fledgling semiconductor manufacturing consortium U.S. Memories last week came a step closer to existence through an agreement allowing it to use IBM's 4M-bit dynamic random-access memory (DRAM) technology.

While necessary, however, IBM's blessing is unlikely to prove sufficient to make U.S. Memories a success, analysts said.

The seven technology companies that committed to the consortium in June set four goals indispensable to the effort's success: an acceptable business plan, a favorable legal opinion with regard to antitrust clearance, the IBM technology license and sufficient funding — all to be obtained by the end of the year.

Last week's agreement gave them three out of four. However, as the year wound down, the critical mass and critical subscription fees that the founders expected to get from large U.S.-based semiconductor users other than IBM continued to elude U.S. Memories.

Consortium President Sanford Kane conceded that the absence of equity commitments is a sizable impediment but took the optimist's view. Calling the newly inked technology agreement an important step, he added, "I hope IBM's support will encourage those who are considering investing in this project to make a positive commitment to the future of the domestic semiconductor and electronics industry."

Drew Peck, an analyst at Donaldson, Lufkin & Jenrette, doubts that it will.

"The whole goal [of founding U.S. Memories] was to develop interest in companies *other* than IBM," he noted. The group's stated mission is to leverage domestic production to buoy U.S. market share in 4M-bit DRAM chips — a seminal technology now dominated by Japanese manufacturers.

"The strategy is horribly undermined when prime consumers aren't buying in," Peck said. To date, none of the 18 user companies approached by U.S. Memories early last month have signed on.

"Companies are reticent because they see no short-term benefit," said Mark Giudici, an analyst at Dataquest, Inc., a market research firm based in San Jose, Calif. Although a DRAM drought recently ranked high on the list of crises plaguing the computer industry, be noted, "Now, there is abundant memory — and also, [user] companies are doing deals with independent companies — American, Japanese and otherwise. [Korean giant] Samsung, for instance, is coming on very strong."

"The reality is that there are alternatives to U.S. Memories," Peck said. "And they're available for less than the \$10 million to \$15 million that companies would have to pay to join U.S. Memories."

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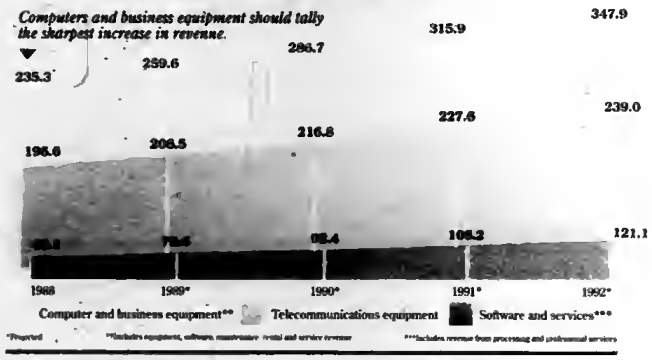
TRENDS

INDUSTRY OUTLOOK

Worldwide revenue of U.S. information technology industry

(in billions of dollars)



Units shipped

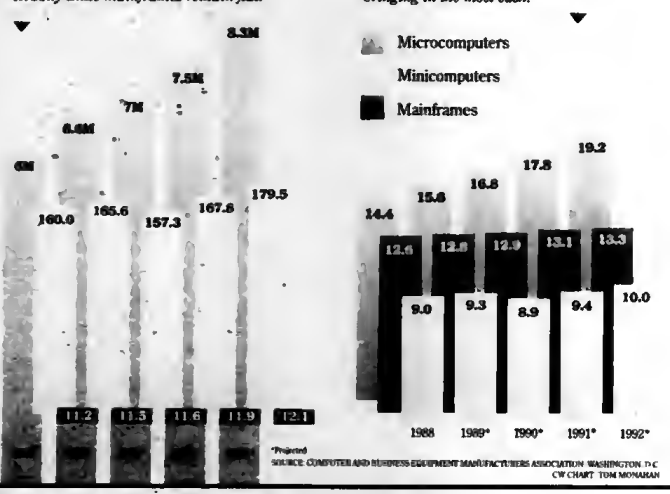
(in thousands)

Microcomputer shipments will increase steadily while mainframes remain flat.

Revenue

(in millions of dollars)

Microcomputers will be the systems bringing in the most cash.



NEXT WEEK

The use of information systems for competitive advantage is an old saw in business but a new concept in academia. Manager's Journal looks at the unusual approach of Worcester Polytechnic Institute in Massachusetts, where **David Cyganski's** IS department is mandated to help the college gain market share — in the form of quality students.

BRUCE SPITZER

Outsourcing: Is it this year's fad or a viable alternative to do-it-all-yourself IS operations? Executive Report looks at the whether, when, why and how of such a move, detailing both the cost advantages and the downside risks. If you are wondering whether you should contract out some IS functions, this section is a must-read.

INSIDE LINES

What better time to suffer a little dose of humility and wipe the slate clean than with the turn of the new year? So, in the spirit of 'fessing up and making resolutions of what not to do, here's a sample of tips that crossed our plate in 1989 but never happened; some made it into this file, others didn't.

Rumors were hopping at Unisys in the second half of the year as the company went through the now-traditional cycle of big company downsizing. As employees worried about the targeted work force reductions and their own roles therein, they also started wondering about the longevity of their bosses. During the fall, the internal scuttlebutt had Chairman Michael Blumenthal imminently handing in his resignation to the board and stepping aside in favor of ubiquitous entrepreneur H. Ross Perot. Never happened; however, two weeks after the phone calls started, the company did outline how it was going to achieve those reductions.

Our staffers recall analysts who speculated that Cray and Apple were considering a merger. This was at a time when Cray was beginning to get into trouble and Apple was hyping its ties to Cray. That one sank mercifully to the bottom and may have contributed to our skepticism that Hewlett-Packard and Apollo were about to merge — *c'est la vie!*

Cullinet was a favorite subject of the speculative wags, with several tipsters pointing us to an acquisition, variously, by Fujitsu, DEC and — one reporter swears by this — IBM. And, of course, that perpetual favorite among competing software firms: Dun & Bradstreet is about to unload McCormack & Dodge; what a refreshing change of pace to see an acquisition of Management Science America by a firm that everyone has been counting out for three years.

Troubled Wang Laboratories, particularly after the departure of Fred Wang, was a constant source of speculation throughout the year and likely will be again in 1990. With the Doctor looking to fill the vacant seat, speculation was ripe that John Cunningham is the next president of Wang; no, wrong John, it's John Cullinane as the next president of Wang. Things started looking up when someone tipped us off that Wang would claim somebody with a past at General Electric. Gotta be Anthony Craig, likely-to-soon-depart head honcho of privatized Prime, we figured. What a surprise. "Who the heck is Richard Miller?" the news editor shouted at an equally surprised reporter.

Probably our most embarrassing blooper was an Aug. 28 report on upcoming IBM PS/2 Model 75s and 90s. We ain't seen them yet, and we don't plan to rely on the sources for that one again.

Enough mea culpa

We're not the only ones who mess up. A worker at a McDonnell Douglas unit called the other day to pass on this observation of brilliant systems administration: Staffers came in one morning to discover that they could not log on to their E-mail system. They contacted the systems department to find out what was going on and were told that passwords had been changed for security reasons. So, what's the new password? "Oh, we sent you all an E-mail on that."

Cancel that air reservation

Responding to a query on extraordinarily high Silicon Valley atmospheric discharges of heavy metals and other particulates, Jackie Bogard, director of environmental programs for the Santa Clara Manufacturing F Group, said, "There are many substances, including minerals and metals, that we as human beings absolutely must have in small amounts to maintain a healthy state."

And that's all we wrote to close out 1989. It's been a fun year trying to pique your interest and respond to your tips, complaints and queries. As Barbara Walters says, "We're in touch, so you be in touch." Keep calling News Editor Pete Bartolik at 800-343-6474, and we'll try to get to the bottom of what you think is going on.

An Overnight Merger Isn't Going to Make MSA and McCormack & Dodge Suddenly See Eye to Eye

MSA and McCormack & Dodge are doing a lot of head butting right now. Which of their products do they keep. Which do they abandon. And what do they do with customers who are left waiting on the sidelines for answers.

But you don't have to worry. Integral knows the score. That's why we'll continue to deliver SAA Financial and Human Resource solutions that make sense for your company's future — not offer software that might be phased out soon due to the financial considerations of a merger.

SAA solutions, not mergers, have made us IBM's premiere business partner and the recipient of their Outstanding Achievement Award for exceptional performance.

That's why over the past few years, when we've squared off against MSA or McCormack & Dodge, we've come up the winner 80% of the time. Now, with their merger, our odds just got better.

Call us. See what kind of a game plan we can put together for your company. One thing's for sure. It's going to be a winner.

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